The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXXIX. September 3, 1938 No. 1,001

Problems of the Industrial East

MANY industries to-day trade extensively with the East and draw from that source much of their raw materials. Although so far distant in terms of miles, there can be little doubt that conditions in India, in China, in Japan and other parts east of Suez will exercise an increasing influence upon Western industries, a fact which has already become evident to those who have noted the growing industrialism of all these countries. A comprehensive and first-hand survey published by the International Labour Office of the League of Nations under the title "Problems of Industry in the East" shows how the industrial growth of these countries has progressed.

The East was regarded up to the present century as an extensive market for the manufactured products of the West in exchange for specialised oriental produce. Then the idea of growing foodstuffs and supplying raw materials on a large scale for the world market took shape and was applied by European capital and management—the industrialisation of the East had begun. It has now become the main source of supply of a number of the world's raw materials; owing to its unlimited reserves of labour and the fertility of much of its territory, its future productive capacity is incalculable.

It is not only in respect to raw materials that the East is important. Japan has shown how it can compete with the West in the industrial field. The population of the country has increased by 60 per cent. since the beginning of the century, while the output of industrial products during the same period has risen to twelve to fifteen times what it was. The 1937 production showed a 75 per cent. increase over that of 1930. India, too, ranks among the eight chief industrial states, and by 1941 is expected to have a population of 400 millions, making it the most populous country of the world. In the present emergency the Chinese Government is doing its utmost to increase the industrial power of China, the establishment of heavy industries being among its principal objects. There can be no doubt that with education and training Oriental labour can produce most of the articles which the West has been accustomed to regard as its own monopolies. Education is clearly regarded by Mr. Harold Butler, the author of the International Labour Office report, as the key to the situation. He draws attention to the enormous advantages which Japan derives as an industrial country from the foresight of her statesmen in determining to abolish illiteracy. Great Indian concerns, such as the Tata Iron and Steel Company, the Buckingham and Carnatic Mills, and others are providing free education for the children of their workpeople, largely with the object of creating a source from which a better type of labour may be obtained in the future.

As regards the efficiency of the worker, the International Labour Office report states that "what is really surprising is not the width of the efficiency gap between Indian and Western industry, but its comparative narrowness, which is diminishing further every year." Among the fundamental factors in industrial efficiency is that of health. The ratio of comparative inefficiency in India may vary from 25 to 85 per cent. of the European standard and it has been found that poverty, ill-health and illiteracy are the cause. Remove these and we have in India alone a population of 400 millions as efficient industrially *man for man* as the 45 millions of Great Britain, or the 65 millions of Germany. As one authority has put it: "If the laws of health were regarded in India to the same extent as in England and the same proportion of money was spent on public health, the death-rate in India would be no larger than in England." There can be little doubt that medical science and the spread of education will largely bring about these conditions, perhaps even in our generation. The result must be a widespread increase in industrial efficiency, a growth in population in a country that is already the most populous in the world, and an increasing desire for remunerative employment. It cannot be doubted that the solution of the difficulty must lie in the spread of civilisation as we ourselves understand it, in increasing the standards of education among these largely illiterate people and in particular in the promotion of higher standards of living so that these potentially industrially active masses may be their own potential consumers. Abundant production does not lead to prosperity unless there is also abundant consumption. We come back to the old problem of devising an economic system which shall enable everybody to have as much as he wants of everything. There is no shortage of the material things required.

The activities of the merchant are of no less importance to-day than they were when free markets existed throughout the world, but Government restrictions in the form of tariffs and currency control are hampering the merchant's natural function of developing trade between one country and another. There are welcome indications that industry is again recognising the merchant as the proper medium for distribution in the world's markets.

—*J. F. A. Segner.*

Notes and Comments

Chemical Trade with Argentina

BOTH the quantity and value of imports into Argentina during 1937 reached the highest figures recorded since 1930, according to a report on economic and commercial conditions in the Republic issued by the Department of Overseas Trade. Imports of chemical products rose by about 20½ per cent. in value over 1936, but suffered a slight setback as towards the end of the year. This setback was common to imports of nearly all commodities, being due to excessive and largely speculative buying in the early months of the year. United Kingdom manufacturers shared in the increase of total imports of heavy chemicals brought about by the increased consumption due to the country's general prosperity. The total manufacturing industry is expanding, and competition increasing, particularly in the case of mineral acids. It is considered in the report, however, that prospects are fairly bright for U.K. chemical manufacturers. The increase in chemical imports was distributed fairly evenly among the various products, sodium carbonate, alkalies, pigments, and dyestuffs showing large gains. The quantity of barytes imported last year was slightly more than double the quantity of 1936, owing principally to the growth of the local paint manufacturing industry. For the last period for which countries of origin are available, Germany and Italy were the sole suppliers of this product; there would accordingly appear to be an opportunity for U.K. producers. More intensive competition was experienced in the drug, pharmaceutical speciality, and patent medicine trades, and U.K. manufacturers gained little ground. Some foreign companies now hold stocks of their drugs in Argentina and do the packing locally; the report concludes that unless our manufacturers adopt similar methods it is unlikely that they will be able to improve their position.

Putting the Scaremongers in their Place

THE business community is keeping its head a great deal better in the troubled condition of Europe than the large sections of the political world and of the Press. There is grave tension on the Continent, and scaremongering in Central Europe is unhappily to be expected. But there is no need for anyone in Great Britain to get into a panic about Czechoslovakia. Our most confirmed pacifists think and talk of nothing but imminent war. The leaders of industry and commerce, having a surer appreciation of the facts, calmly pursue their peaceful activities, and lay their plans for a normal future. The current war talk is not only foolish, but palpably unwise. No war was ever inevitable, and Great Britain has no hereditary enemy. The casting of Germany as the villain of the piece by the weaker-kneed among us is positively wicked. There is, and can be, no evidence that the German Government is prepared to upset the peace of Europe if it does not get its own way in the near future. There is a serious crisis in its relations with its southern neighbour, but a British mediator is at work and diplomacy is employing its strongest resources. Lord Runciman, who has as shrewd a head and as realistic an outlook as any public man living, is showing admirable temper and undimmed spirit in the discharge of a characteristically British task. He may conceivably fail to secure the settlement which all parties would regard as ideal, but he would be the last man to subscribe to the panic theory that, if the gloomiest view were taken of the result of his constructive effort, the world would find itself plunged into the abyss. The German rulers are admittedly not the most tactful of their species, but nobody with intimate knowledge of the internal condition of their country believes that they want an early war, or would deliberately provoke one. The financial position of Germany alone, seeing that she possesses only 1 per cent. of the world's stock of gold, should be decisive against an appeal to the argument of force, which must entail large purchases beyond her frontiers.

The Business Man Gets on with his Job

THERE are other chinks in Germany's armour, which the individual reader will have little difficulty in filling in. The British business man knows them well enough, and that is why he refuses to be rattled by a State technique, which seems more sinister than it may possibly prove to be, because it has never been employed before. The best proof of his steadfastness is that he is not selling his securities or keeping his stocks low, but is just getting on with his job. He simply does not believe in impending war, and he is almost certainly a surer guide than many of his political and journalistic mentors. The British and American Governments, too, are not behaving as if war was round the corner. They are putting the finishing touches to a long-term trade treaty of the most comprehensive kind between the two countries. This month, when that great factor of peaceful development comes to fruition, the folly of the present war scare will be the more thoroughly exposed. There will then be all the elements of a substantial trade revival. Not that the so-called recession has been so severe as the academic economists would have us believe. Trade has been a little quiet lately, more particularly in the export branch, but for *The Times* of all authorities to take a depression for granted is to be defeatist in the face of all the portents. It is time for the Jeremiahs to be put in their place. If the world is working out its serious problems to their logical conclusion, it is peace and not war that it is driving to.

A New Institute for Medical Research

SYNTHETIC organic chemistry has made great progress in recent years by the production of compounds serving most useful purposes in preventive and curative medicine. Probably the discovery of the sulphonamides more than anything else showed the enormous possibilities in this field. The Squibb Institute for Medical Research, which has just been founded in America, is a research organisation supported by industry to investigate problems of interest both to the chemist and the medical man. The work will be divided into four main sections; organic chemistry, experimental medicine, pharmacology, and bacteriology and virus diseases, with biochemistry and medicinal chemistry laboratories. The staff of the Institute has been chosen from men who have distinguished themselves in university research, and they will carry on their work in conditions similar to those of the university. The studies to be undertaken include the preparation of new chemotherapeutic compounds, hormone preparations, and the isolation and purification of vitamins, particularly vitimins V_1 and B_6. Clinical facilities for the observation of patients will provide that link between the laboratory work and medical practice essential in determining the ultimate value of a preparation. Lack of this co-operation is the biggest stumbling-block in the path of chemotheropeutic development. The difficulty in obtaining this co-operation is understandable; the medical profession is naturally chary of utilising any preparation until its physiological reactions on the human have been thoroughly investigated.

Inorganic Accelerators in Rubber Compounding

By
T. L. GARNER, M.Sc., F.I.R.I.

THE rapid growth in the use of certain organic compounds as accelerators of vulcanisation in the rubber industry has by no means resulted in the abolition of all rubber mixings, accelerated in rate of vulcanisation by the older types of inorganic accelerators, such as litharge, zinc oxide, or magnesia. The latter were, of course, essential ingredients until comparatively recent times in the industry if a well-vulcanised article was to be produced, and there are still many cases where their use is considered advisable and organic accelerators are omitted. The use of these inorganic compounds in the rubber industry dates back to the discovery of vulcanisation itself, and it is interesting to recall in connection with the celebrations next year of the centenary of Goodyear's part in the discovery of vulcanisation, that in his celebrated patent he claimed vulcanisation by means of sulphur and litharge, and apparently considered the latter compound essential to the process; Hancock at about the same time showed vulcanisation to be possible with sulphur alone.

Considered purely as mineral accelerators of the vulcanisation process, it is probable that litharge is the most important to-day because of its value for certain open-cure work, particularly footwear; magnesia is still an important accelerator, however, and lime is used in hard rubber and in mixings where porosity is likely to occur in its absence. Zinc oxide is now very little used for its accelerating properties, although large quantities are used in compounding as an activator for organic accelerators, as a white pigment, and as a reinforcing agent.

Calcined Magnesia of Two Grades

Magnesia. Calcined magnesia, as used in the rubber industry, is available in two grades, heavy and light, both of which have the same gravity, but the latter being considerably more bulky. The heavy grade is prepared by heating the naturally occurring magnesium carbonate, magnesite, while light calcined magnesia is obtained by calcining the carbonate of magnesia of commerce, which is a basic carbonate, $4MgCO_3.Mg(OH)_2.5H_2O$. Both these varieties have a pronounced accelerating action on the rate of vulcanisation, but the light grade is more effective, the activity being greater the finer the sub-division of the particles. Light calcined magnesia is naturally more costly than the heavy grade, but it must be borne in mind in making a comparison that it has six times the bulk of the heavy variety. In storing, closed containers should be used, since both absorb moisture from the air, and in addition, the light calcined grade, which is basic, also absorbs carbon dioxide from the air.

The usual tests on both varieties are for grit content, moisture, volatile matter and bulk. Grit is conveniently determined by the Porritt-Gallie Grit Detector, now standard for this purpose thoughout the industry, and moisture in the usual manner using a shallow weighing bottle. Loss on ignition is important, because this gives an indication of the thoroughness of the calcination, since magnesium carbonate, while a desirable compounding ingredient for some purposes, seriously impairs the activity of the oxide if present in quantity. The method of determining bulk is the usual one using a glass measuring cylinder. In the following table are given average figures obtained over a period in examining the above properties for both grades of magnesia.

Grade.	Grit on Porritt-Gallie apparatus. 100 mesh	200 mesh	Moisture.	Moisture & volatile matter.	Bulk. (100 gms.)
Light calcined magnesia	0.03%	0.21%	0.27%	2.25%	637 ccs.
Heavy calcined magnesia	0.008%	0.10%	0.54%	3.27%	125 ccs.

Compared with lime, the light calcined magnesia is approximately 50 per cent. stronger in accelerating action, although with both grades, the activity varies considerably with the method of vulcanisation adopted. Thus, the greatest activity is shown in open steam curing, less activity in ordinary moulded press work, and least of all in dry heat vulcanisation. Heavy calcined magnesia has about the same activity as lime, but both magnesias give rubber with a smoother texture. For rough comparison, it is considered that 5 parts of the light calcined magnesia are equivalent to 7 parts of the heavy grade.

The use of both grades has decreased considerably in the past ten years, but they still serve a useful purpose as inorganic accelerators. It is of interest to note that the accelerating action of the magnesias has been considered of a secondary rather than a primary nature, consisting largely in effecting a response from the natural accelerator in the rubber, amounts in excess of that required by the natural accelerator not being effective.

Disadvantages of Lime

Lime. One of the disadvantages to the use of lime in rubber mixings is the rapid deterioration which occurs in stocks containing it when they are subjected to over-vulcanisation. Consequently, when using lime, over-cure must be guarded against, or premature ageing and poor performance of the rubber product will result. Although a constituent of the majority of old-time mixings, lime has to-day largely lost favour, being used only occasionally in soft rubber goods, particularly where porosity may occur in its absence. Lime absorbs moisture and hydrogen sulphide formed during vulcanisation, and prevents them causing porosity. In hard rubber, lime is still used for this purpose in some cases. As with magnesia, lime is most effective in open steam vulcanisation and least in dry heat curing.

The usual tests to be carred out on lime are loss on ignition, carbon dioxide content, grit, and manganese. The loss on ignition should be about 24 per cent., but this figure will be higher if calcium carbonate is present to any extent; if the figure is not greatly in excess of 24 per cent., however, it may safely be assumed that very little carbon dioxide has been absorbed. Average figures obtained over a period on various tests are given below :—

Loss on ignition, 22.8 per cent.
Insoluble in 10 per cent. HCl, 0.03 per cent
Carbon dioxide, 1.32 per cent.
Grit on 60 mesh (dry), 0.19 per cent.
Manganese, 0.0019 per cent.

Gradual Replacement of Litharge

Litharge. Litharge is prepared by the careful oxidation of a suitable copper-free grade of lead in a reverberatory furnace. Copper and manganese are equally undesirable in any rubber compounding ingredient because of the poor ageing properties which they impart to the rubber containing them. Litharge appears on the market in two forms, one yellow, produced at a temperature below the melting point, and the other brown, produced at a temperature above the melting point of the oxide. The colour is immaterial for rubber compounding, provided the material is satisfactory on the various specifications tests.

For many years, litharge has been used extensively in the production of rubber footwear, although it is gradually being replaced by better and more modern organic accelerators. Its value for vulcanisation in hot air lies in the fact that it not only shortens the vulcanisations period, but exerts a protective action which gives to the finished article a dry, non-tacky finish. There are many articles which are vulcanised on formers in open cure where the initial vulcanisation or set-up must be very rapid at comparatively low temperatures,

if sagging or other deformation is to be avoided, and for such purposes litharge is not sufficiently rapid in its action.

Litharge may still be regarded as the most important of the inorganic accelerators, although the large quantities formerly used have decreased considerably. To function properly in a mix, it requires the presence of suitable acidic substances, and in fact if raw rubber is used from which the natural acidic materials have been extracted, vulcanisation with litharge is impossible. Pine tar is a suitable softener to use in a mix with litharge to increase the acidic content, but care must be taken to see that premature vulcanisation or "scorching" during milling does not occur. Because of the lead sulphide formed during vulcanisation, all litharge-containing rubber compounds are black; in rubber footwear production this is a further point in favour of the more modern organic accelerators, since much of the demand to-day is for brightly coloured goods. The ageing of litharge compounds is generally satisfactory, providing the proportion of sulphur is kept below three per cent. on the rubber.

There are factory regulations governing the use of litharge because of the possibility of poisoning. In consequence of this and the comparatively small quantities now used, many firms now prefer to purchase litharge-master batch material from supply companies instead of mixing themselves. In this way, the necessity for special precautions for occasional mixings is avoided since the master batch presents no poisoning problem in handling.

The necessary tests on litharge are for moisture content, grit, copper and manganese content. The latter should not in either case be allowed to exceed 0.002 per cent., and the most careful attention to this point is essential, since these metals are likely to be present in the cheaper grades in dangerous amounts. In addition to the above tests, metallic lead should be absent, since any particles of free lead passing into the rubber may produce pin-holes on the surface. Lead peroxide should also be absent.

Cuprammonium Dispersions of Cellulose

Their Nature deduced from Optical Properties

A STUDY of the optical and mechanical properties of various cuprammonium dispersions of cellulose has led Compton to propose modifications of the existing theories of the nature of these dispersions (*J.A.C.S.*, 1938, *60*, 1807-1812). Cellulose fibres were broken down by different treatments, namely immersion in 0.01 N HCl, and in HCl of 1.18 density, in 0.04 N sodium hypochlorite solution, and in 4 per cent. sodium hydroxide containing an excess of hydrogen peroxide. The products obtained, after thorough washing, were dispersed at 0.5 per cent. concentration in cuprammonium solutions containing 15 g. of copper, 240 g. of ammonia, and 1 g. of sucrose per litre. Determinations of viscosity, optical activity, and the number of particles visible in the slit ultramicroscope, were made on each solution.

Disintegrating Solutions

Treatment of cellulose for extended periods with the various disintegrating solutions reduced the viscosity of the 0.5 per cent. solutons prepared from it to a final limiting value independent of the nature of the treatment. At the same time the optical activity was in no way affected, and particle counts on solutions which had reached the limiting viscosity were practically the same as those on solutions of untreated cellulose (wood pulp), which in turn agreed well with the number to be expected if the cellulose disperses in the form of macromolecules of uniform size $1.1 \times 1.5\mu$, which were established by Farr and Eckerson to be the fundamental micelles or building units in cellulosic materials. It was also established that there is a true saturation concentration of cellulose in cuprammonium solutions at 4.5 per cent., independent of the copper content.

From the results it is concluded that the fundamental micelles of Farr and Eckerson are responsible for the optical activity of the solutions, and that in native cellulose these micelles are held together by a cementing material which produces the high viscosity of its cuprammonium dispersions. Oxidising agents or strong acids destroy or dissolve this cementing material, thereby reducing the viscosity. The micelles and cementing material are presumably separately dispersed by the formation of a cellulose copper complex. Since cellulose added to a cuprammonium solution in excess of 4.5 per cent. can be entirely recovered unchanged by centrifuging the dispersion, whereas the material obtained by regeneration from the solution by addition of acid is in the hydrated or mercerised form, it is concluded that formation of the copper complex occurs simultaneously with dispersion, and is a necessary preliminary to the formation of hydrated cellulose.

Fatty Acids from Petroleum

Synthetic Products suitable for Soap and Fat Manufacturers

THE large scale production of acids suitable for the manufacture of soaps and the synthesis of fats, has been accomplished by the oxidation of hydrocarbons with atmospheric oxygen, at the Ludwigshafen works of the I.G., and the process is described by Wetzel (*Angewandte Chemie*, 1938, *51*, 531-537). The starting material is either natural petroleum, tar, or synthetic petroleum from the hydrogenation of coal.

The oxidation is carried out in water-cooled towers up which the oil is forced, air being injected at the same time. The temperature of the reaction, which is, of course, exothermic, is maintained by water-cooling at about 80-120° C., that is, it takes place in the liquid phase, since gas phase oxidation leads to excessive production of unsaponifiable oxy-compounds, and also splitting of the chains. The rate of passage of paraffin through the towers is adjusted so that some of it remains unoxydised, so as to avoid excessive production of unsaponifiable substances; for the same purpose the air is injected in as fine a state of subdivision as possible. A catalyst of unstated nature is employed, and the speed of the reaction considerably increased thereby, the amount of undesirable side products being reduced. The unsaponifiable material after separation from the fatty acid is returned to the oxidation towers, since it contains large quantities of unattacked hydrocarbons.

Saponification Process

The mixture obtained from this oxidation step is first saponified with alkali, so as to get the fatty acid into aqueous solution. A part of the unsaponifiable material can be separated mechanically, since it floats on the soap solution; a considerable quantity remains either dissolved or emulsified in the solution and must be separated by other means. The separation is accomplished either by extraction with an organic solvent, or by distillation. The solvent usually employed is a mixture of benzine and propyl or butyl alcohols. Distillation of the unsaponifiable material from the soap after evaporation of the water is difficult to accomplish without decomposition of the soap, but has been achieved by the methods employed in coal hydrogenation.

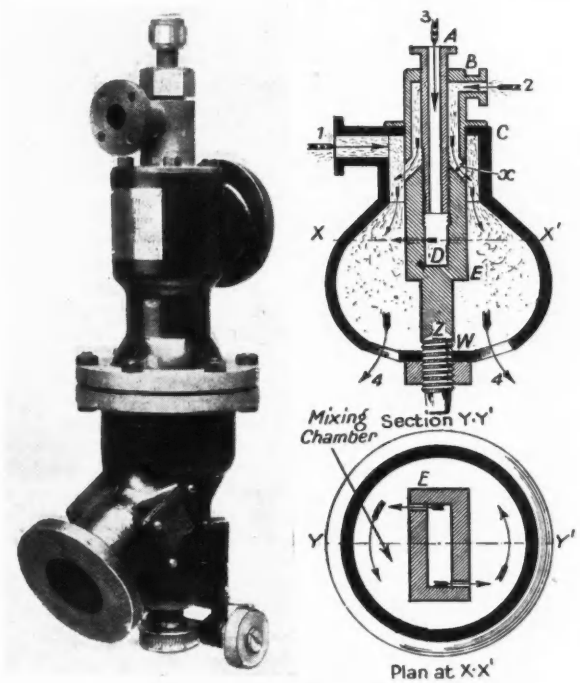
The soap obtained is a mixture of sodium salts of fatty acids of widely differing chain lengths and degrees of saturation. It is converted to free fatty acids with a strong mineral acid, and the liberated acids are fractionated in a vacuum still. A yield of about 50-80 per cent. of desirable acids, based on the initial hydrocarbons, is obtained. These acids are suitable for the manufacture of washing soaps and soap powders and, when mixed with natural oils, of quite high grade toilet soaps.

A New Homogeniser

Apparatus for Continuous and Rapid Action—Its Application in Oil Refining

A MIXER for obtaining continuous and practically instantaneous homogeneous mixing of crude petroleum and the sulphuric acid used in refining, has been designed by the French engineer J. N. Cordebas. The apparatus can be used equally well for a large number of operations where intimate mixing is required. In principle the apparatus consists of two concentric tubes leading into a mixing chamber into which one of the two products to be mixed is admitted. The second product is introduced through the outer of the two concentric tubes, while the inner concentric tube serves to admit air used to give the liquids in the mixing chamber a swirling motion.

The inner concentric tube (A) is screwed into a block (E), conical at the top and rectangular at the bottom. A chamber (D) is hollowed out inside the block, and is provided with two small holes from which the air, entering by the tube (A), can escape into the mixing chamber. The conical top of the block (E) is designed so that it will act as a regulating



The Cordebas Homogeniser.

cock to control the flow of liquid (acid in the case of oil refining) from the outer of the two concentric tubes (B). By means of a control handwheel at the base of the mixing chamber, the block (E) can be screwed up or down to regulate the flow of acid.

In operation, the oil to be refined is admitted by an opening (1) at the side of the mixing chamber (C). At the top of the chamber the requisite amount of sulphuric acid is introduced through (2) and the outer concentric tube (B). The air escaping by the holes in the block (E) gives the oil and acid a rapid swirling movement which causes a thorough mixing of the two constituents. which flow, homogeneously mixed, out of the openings (4) in the lower part of the mixing chamber. The principal advantage of the system in this application lies in the rapid producton of homogeneous mixing. Exactly proportioned quantities of oil and acid are constantly being mixed thoroughly, within about one-thirtieth second of their first contact, so that the refining is absolutely uniform and there is no danger of the oil being attacked by an excess of acid.

When installing the mixer acid and oil are each supplied to the apparatus by an independent centrifugal pump, connected in parallel with a by-pass valve, set for a pressure of 2 kilogrammes (28.44 lb. per sq. in.). In this way, should the pressure on the delivery side of either pump rise above this pressure, the excess pressure will be released through the by-pass. Air is fed to the mixer under the same pressure from a compressor.

It is claimed that the mixer not only brings about a saving of oil (none is destroyed by excessive acid concentrations), but also it is possible to obtain better refining with the use of less acid. It is said that an optimum refining can be obtained with a 10 per cent. acid, while to obtain an equivalent refining by ordinary vat mixing methods a 17 per cent. acid is required.

Pressure Losses in Pipe Bends

Investigations at the Bureau of Standards

IN even the simplest piping system, the pipes must change direction in many places. Therefore, bends, and particularly 90° bends, are perhaps the most frequently used fittings. As pressure losses in bends are greater than in the same lengths of straight pipe, the effect of a number of bends in a pipe line is to decrease the flow. To obtain a given flow, it is necessary to increase the pipe diameter or to provide more pumping capacity, either of which expedients increases the expense of the installation.

Many experiments have been made to find the exact pressure losses in pipe bends, but the results seem to be very inconsistent. A paper by K. Hilding Beij in the July issue of the *Journal of Research* (United States Bureau of Standards) describes an investigation which forms part of a general programme under way at the National Hydraulic Laboratory, to determine the reasons for these inconsistencies, with the ultimate object of developing, if possible, reliable formulas for computing pressure losses in pipe bends.

The experiments concern 90° pipe bends in 4-inch pipe lines. Tests were made on bends varying from 6 to 80 inches in radius. It was found, for bends having a radius of four times the pipe diameter or less, that the results could be brought into agreement with those made by previous experimenters under comparable conditions, provided the roughness of the pipe walls was taken into account. More work was needed, however, to determine the exact relationships, and hence a working formula.

For bends of radius greater than four times the pipe diameter it was found that other unknown, and as yet unpredictable, effects obscure the problem. Until this problem is solved, the designer must use the experimental results which indicate the highest pressure loss in order to be certain that the pipe capacity will be sufficient.

A LARGE deposit of China clay, perhaps the largest in South India, has been discovered at Kundara, a village six miles from Quilon, in Travancore. According to analysts, the deposit is of a very rare variety of China clay admirably suited for the manufacture of kaolin and china ware. The proximity of the place to the Quilon Backwater and the availability of fresh water make the exploitation of this deposit extremely economical. The Government of Travancore have therefore decided to start a ceramic industry at the spot, which will begin to function in the course of the next few months.

Chemical Trade with Argentina

Notable Increase in Quantity and Value of Imported Materials

IMPORTS into Argentina have expanded steadily in quantity since 1933, and in 1937 they exceeded 10 million tons for the first time since 1930, states a report on the economic and commercial conditions in the Argentine Republic (dated April 1938), issued for the Department of Overseas Trade by H.M. Stationery Office (3s. 6d.). The upward tendency of the value of the imports which first appeared in December, 1936, continued during the first nine months of 1937, a peak being reached in September. Then began a downward reaction reflecting the decline in orders from May onwards, after excessive and largely speculative buying at the beginning of the year. All commodity groups shared in the expansion, there being a notable increase in value of chemical imports from 73,000,000 pesos in 1936 to 88,600,000 in 1937.

Bright Prospects for U.K. Products

Argentine prosperity in 1937 was reflected in the increased consumption of industrial chemicals. In the alkali trade United Kingdom manufacturers continued to supply most of the imports, competition from Japan being less acute than the year before. In bleaching powder Italy showed more interest in the Argentine market, and in December the first supplies were available from the new plant erected by an Argentine firm in Rosario. Two tartaric acid plants were built in the Province of Mendoza, and it seems probable that between them they will shortly be in a position to supply the entire requirements of the Argentine wine industry. The market for mineral acids was, as usual, catered for by Buenos Aires firms, and competition will be intensified when another large sulphuric acid plant, now being built in the Avellaneda district, starts production. Broadly speaking, prospects for United Kingdom chemical manufacturers are fairly bright, although there is every reason to believe that their local rivals will continue to extend their activities and supply a growing share of the demand.

United Kingdom manufacturers found business in drugs increasingly difficult owing to severe competition from France and Germany. A French company opened a local branch with large stocks, and two German firms started to pack drugs and pharmaceutical products locally, thereby reducing their costs as regards duties. In view of these developments it is evident that unless United Kingdom manufacturers adopt similar trading methods they have little chance of improving their position. There is a big demand in Argentina for pharmaceutical specialities, but the more important United Kingdom manufacturing chemists, with one or two exceptions, have so far hesitated to enter the market, and the greater part of the business is in the hands of German, French, U.S.A., as well as to a smaller extent, Italian manufacturers.

Patent Medicines and Sheep Dips

Imports of patent medicines rose from $2,541,549 pesos paper in 1936 to $2,782,109 in 1937. United Kingdom manufacturers made little headway, many of them being discouraged from entering the market by the delays which occur in obtaining the necessary official approval or permit for the sale of any new imported product, and the trade is principally in the hands of the French, German, Italian, Swiss, and U.S.A. manufacturers. The local speciality and patent medicine industry has developed considerably, several German, French and U.S.A. firms now manufacturing locally.

There was increase in the consumption of sheep and cattle dips, the imports rising to 8,871 tons from 7,460 tons in 1936. United Kingdom dips still dominate the import trade, attempts by a German manufacturer to secure a footing having failed. It is anticipated that imports will decline in 1938 as most importers had substantial stocks left on their hands at the end of 1937.

The consumption of paints, enamels and varnishes increased considerably in 1937, but imported products as a whole made only slight progress owing to intensified competition from the local industry which is steadily improving the quality of its output. Two United Kingdom firms manufacture locally and United Kingdom exporters secured the largest share of the import trade, followed closely by the U.S.A., with Germany much further behind. The Argentine Institute for the Rationalisation of Materials (I.R.A.M.) appears to be paying special attention to paints, and once Argentine standard specifications have been established United Kingdom manufacturers should have a better chance of competing, as the standards will necessitate an improvement in the quality of the local products, the cost of which will consequently increase. The total imports of paste paints in 1937 amounted to 360 tons as compared with 346 tons in 1936, local competition in this line being particularly severe. The external trade in varnishes in general amounted to 519 tons as against 427 tons in 1937. Arrivals of ready-made paints containing varnish and anti-corrosives fell from 869 tons to 825 tons, the United Kingdom holding the lead, with the U.S.A. close behind. Imports of enamels, including cellulose paints, rose from 661 tons to 776 tons, 80 per cent. of which are estimated to have come from the U.S.A. United Kingdom manufacturers maintained their position as the chief suppliers of water paints.

Growing Needs of the Paint Industry

More raw materials were required to satisfy the growing needs of the local paint industry. In catering for this demand the United Kingdom encountered strong competition from the Continent, principally Germany, Italy and Poland, while Japan successfully entered the market with a cheap quality of red lead. In the 30 per cent. grade of lithopone, which is used in large quantities, Poland under quoted the United Kingdom by about 20 per cent. and the Polish product was said to be adequate for all paints except the highest qualities. In zinc oxides also Polish prices were below United Kingdom quotations. With regard to natural red oxides and yellow ochres, the development of local production under the protection of high duties has curtailed the demand for these materials from the United Kingdom.

As regards national manufacturing industries, 1937 witnessed the inauguration of the first viscose artificial silk yarn mill in this country, built jointly by United Kingdom and U.S.A. interests. The mill started to deliver yarn at the end of 1937, and as the quality is reported to be first class, more and more is being consumed by local weavers. Imports of artificial silk yarn were higher than ever in 1937, but in 1938 they will probably fall off sharply. The only other firm in Argentine making rayon uses the acetate process and operates on a much smaller scale.

OIL TANKERS IN THE RIVER THAMES

AMENDING by-laws of the Port of London Authority came into force on Wednesday permitting the passage of large vessels carrying petroleum spirit in bulk, considerably higher up the Thames than formerly. Under the previous regulations large tankers carrying low-test petroleum could not proceed farther west than the Mucking Light, which is about eight miles below Gravesend. Ships are now to be allowed to go as far as Crayfordness and will be able, under the new by-laws, to navigate the whole of Lower Hope Reach, Gravesend Reach, Northfleet Hope, St. Clement Reach, and Long Reach.

Active Carbon

New Process of Production from Bituminous Coal

A NEW process has been developed, as a result of an investigation carried out jointly by the Fuel Research organisation of the Department of Scientific and Industrial Research and the Chemical Defence Research Department, whereby active carbon of a high quality required in large quantities for gas masks and for a number of industrial processes, can be produced from graded lump coal. An account of the investigation, the cost of which has been borne by the War Office, and of the results obtained, is contained in a publication issued on Thursday by the Department of Scientific and Industrial Research (Fuel Research Technical Paper No. 47, "The Production of Active Carbon from Bituminous Coal," H.M. Stationery Office, 1s. 3d.

Carefully Graded Lump Coal Used

The manufacture of active carbon from coal has been carried out in this country mainly by one firm, the process employed involving the very fine grinding of the coal, briquetting at high pressure without a binder, carbonising at a relatively low temperature, and activating the resulting coke with steam.

The present investigation was undertaken with a view to using carefully graded lump coal, so as to dispense with the necessity for grinding and briquetting, and thus to reduce the cost of the finished product. The method constitutes a radical departure from previous practice.

The report discusses the reasons for the employment of the briquetting process. When coal is carbonised by heating in a closed retort, the escaping gas, tar and steam give the remaining coke a cellular structure. The existence of these cells is essential if the coke is to be converted into active carbon. But with caking coals used for the production of ordinary cokes the cells are relatively large and consequently the total internal surface active in absorbing vapours, etc., is correspondingly small. Any attempt to produce a larger active surface by exposing the coke to reagents, such as steam, only makes the cells larger and thus has the opposite effect to that desired. With non-caking coals a weak coke having no cell structure visible to the eye is produced.

Hitherto the difficulty has been got over by suitably blending caking and non-caking coals and carbonising briquettes made from the blended material. Knowledge resulting from the work of the Physical and Chemical Survey of our National Coal Resources, whose headquarters are at the Fuel Research Station, suggested that coals were available which had, as a natural property, the correct degree of caking power to give strong, hard coke without a large cell structure. Such coals are found in the dull, hard coal, or durains, occurring in bands of sufficient thickness to be separated by hand from the bright coal, in the Nottingham, Derbyshire, and South Yorkshire coalfields. Other possible coals are the "hards" from Northumberland, Warwickshire slate coal, certain coals from Fife and from South Wales. All the coals tested were not found to be equally satisfactory, but the reserves of coal suitable for the preparation of high-grade active carbon disclosed by the experiments are much greater than are likely to be required. Some of the best results were obtained from Sherwood Hards, and this coal was chosen for full-scale experiments.

Early Stages of the Investigation

In the early stages of the investigation, when the quantities of coal obtained for trial were usually small, the procedure adopted was to carbonise the coal at about 480° C. in small-scale retorts at the Fuel Research Station at Greenwich, and to activate the resulting coke in a specially designed laboratory apparatus at the Chemical Defence Research Department's laboratories at Porton. Where sufficiently large quantities of coal were obtained—mainly in the later stages of the investigation—the activation was carried out in a semi-technical plant at the Fuel Research Station. During this period the effects of a number of variables in the process were examined. An extended range of coals, including anthracites and carbonaceous coals, was tested, and certain experiments on blending and briquetting prior to carbonisation were carried out.

Having achieved success in the production of satisfactory carbon from graded lump coal, the next step was to determine whether the process would work satisfactorily on a full technical scale. The carbonising plant at the Fuel Research Station includes two settings of retorts of similar design, erected for experimental work on the production of smokeless domestic fuel by low temperature carbonisation. The retorts were of full commercial size and were eminently suited to the first stage of the process, namely, the carbonisation of the graded coal. The retorts in one of the settings were built of silica brick, and it was decided to use one of these for the second or activation stage, for which a higher temperature was necessary. One possibility which was visualised during this phase of the investigation was that of using continuous vertical gas retorts for the manufacture of active carbon on a commercial scale. Retorts of this type would obviously be suitable for the high temperature activation stage of the process, but it was thought doubtful whether they could be operated at sufficiently low temperatures for the carbonising stage, without considerable modification of the method of heating to avoid risk of explosion in the cooler parts of the heating flues. Particular attention was therefore paid to this aspect of the process, and in addition certain experiments were carried out to determine whether, in full scale operation, higher carbonising temperatures could be permitted without reducing the value of the finished carbon.

Narrow Vertical Brick Retorts

Experiments were conducted upon coal carbonised at 480° C. and 650° C. respectively.

The coal chosen was again "Sherwood Hards." It was decided to use the grade 1—$\frac{3}{8}$ in., it being regarded as injudicious to attempt to pass steam through coal containing fines below $\frac{3}{8}$ in. size. Also, it was realised that to use a larger size of particle than a 1 in. cube would limit the degree of activation of the final carbon. The lump coal yielded 50-55 per cent. of its weight of graded coal.

The Fuel Research narrow vertical brick retorts for low-temperature carbonisation have been fully described in various Annual Reports of the Director of Fuel Research and elsewhere. The setting contains two retorts, each 21 ft. high and 6 ft. 6 in. long by 7 in. wide at the top, increasing to 6 ft. 6 in. by 11 in. at the bottom. They are externally heated by gas burned in horizontal flues, and the whole construction is enclosed in a $4\frac{1}{2}$ in. shell, of ordinary firebrick and insulated by 9 in. of non-conducting brickwork. The retort is built of Stourbridge fireclay panel bricks (6 in. × 9 in. × $4\frac{1}{2}$ in.), tongued and grooved, and recessed on the combustion chamber side. A casting surmounts each retort and is constructed with facing strips on the inside which are bedded into grooves on the top of the brickwork. The casting carries the coal feed-box and two ascension pipes which are connected to the normal plant associated with coal carbonisation. The bottom casting is supported on the lower steel work and contains the extractor and coke chamber, which is of 10 cwt. capacity. The extractor gear consists of a curved grid or comb, which supports the charge, and behind the comb a set of arms revolve, passing through the teeth and pushing the coke off the comb. With the small size of coal used in the present experiments the coke was able to pass through the grid, and in consequence it was

necessary to make provision to ensure that on discharging coke from the coke chamber the retort did not empty itself. To provide for this a steel plate fitted with a sliding door was fixed vertically inside the coke-chamber mouthpiece so that, after opening the normal discharge door, the discharge of coke could be controlled by this inner door.

In the construction of these retorts provision was made for determining the temperatures attained on the inside wall of the retorts. The arrangement made it possible to calculate the gradient of temperature from the flue to the inner surface of the retort. A knowledge of this gradient then permitted the calculation of the temperature of the inner surface during carbonisation experiments, when only the combustion chamber and thermocouple temperatures could be measured.

In order to carbonise coal at 480° C., it was necessary to employ flue temperatures below the normal, and in order to avoid the possibility of explosion it was also necessary to ensure that no unburnt gases reached a low level in the combustion flues. Some slight difficulty was experienced at first in controlling the inner skin temperature at the desired level of 480° C. but this was soon overcome. There were no difficulties in the actual operation of the retorts. In the second series of experiments, where a skin temperature of 650° C. was aimed at, the special precautions as regards risk of explosion were not required. The inputs of coal at 480° C. and at 650° C. were 2.7 and 5.4 tons respectively per retort per day. A weighed quantity of coal was charged hourly to the feed hopper.

Active Carbon of Greater Strength

The tests showed that the coke prepared at the higher temperature gave just as active a carbon as coke prepared at 480° C. The higher temperature coke also gave a carbon of greater strength.

The retort used for activation was of the same design as that used for the carbonisation of the coal but was narrower, expanding from 4 in. at the top to 8 in. at the bottom. It was, moreover, built of silica brick.

Alterations of a temporary character were made for the supply of the large quantity of superheated steam at a temperature of 500-550° C.

The superheated steam was at first introduced at the base of the retort above the coke chamber. The resistance of the 21 ft. column of coke was such, however, as to cause a high loss of steam by leakage into the combustion chambers. In order to overcome this difficulty four ½ in. steam pipes were inserted through the top casting and extended to project centrally downward into the coke bed. After trying short lengths of pipe it was found necessary to employ lengths of 15 ft. This meant that the upper two-thirds of the retort were being used for activation and the lower third for cooling.

The method of operation of the retort was then substantially the same as that used for the carbonisation of the coal. The retorts were heated to give a uniform skin temperature of 950° C.

Equal weights of activated coke were discharged every two hours and coke was charged at hourly intervals to keep the retort full. The level in the feed hopper was brought to the same mark at intervals in order to check the relative proportion of coke charged and carbon discharged.

When the retort had settled down to steady working conditions the proportion of steam was increased until the product represented about 25 per cent. by weight of the coke charged. Under this condition it was not possible to treat more coke than 140 lb. per hour (1.5 tons per day) and still maintain the desired level of internal temperature of 950° C.

Certain precautions were necessary in the general operation of the retort, and special precautions had also to be taken in regard to the carbon discharged. Each discharge was made into a bin, which was immediately sealed. After two hours it was transferred to a skip, and lightly sprayed with water during the transfer.

The results show that satisfactory active carbons could be prepared on this scale. The work was not continued for a sufficiently long period of time to determine the best conditions. It was obvious, however, from the results obtained, that considerable improvement in the final product woud be possible in a plant designed to suit more closely the requirements of the process. The important changes of design visualised are (1) the provision of a supply of superheated steam at a higher temperature, (2) the alteration of the shape of the retort to assist uniform flow of the material under treatment, and (3) the reduction of the zone of treatment at a high temperature so as to increase the overall yield.

It may be concluded, therefore, that satisfactory active carbon can be made from coke which has been prepared by carbonising a suitable coal at as high a temperature as 650° C. It is not possible to state whether it may be as good as carbon made from coke prepared at lower temperatures, since the experiments were not comprehensive enough to discover optimum conditions. When graded to the correct size, the investigation proved that an activated carbon equal to first-grade commercial carbon for gas respirators can be made.

The activity of the carbons produced during the investigation was assessed by measuring their absorptive power towards carbon tetrachloride vapour carried in an air stream, and, since physical strength is an important factor in certain of the purposes for which active carbon is used, the strength of each product was measured by subjecting it to a standard abrasive treatment. Both these methods of test are described in the report.

In addition, some practical tests were made of the suitability of the carbons for industrial use. For solvent recovery, it was found that the activity of the best carbon made was about 75 per cent. of that of good commercial carbons now available. This result is encouraging, and it is suggested that further research would probably find a means of modifying the properties of coal carbons to make them efficient for benzole recovery. A finely-divided grade of active carbon was found to decolourise crude sugar liquor almost as efficiently as the bone carbon normally employed, but the solution developed acidity too rapidly and this could not be overcome by alkali treatment; it is again suggested that further research might prove useful here. On the other hand, tests showed that the finely-divided carbon will efficiently decolourise liquids, such as crude glycerine, and edible oils, such as palm kernal oil, in some instances being superior to the carbon commonly employed.

Ten Years Back

From "The Chemical Age," September 1, 1928

The obligation on Germany to supply dyestuffs on reparations account expired on August 15.

* * * *

The Union Carbide and Carbon Corporation has concluded an agreement under which it will acquire all the common stock of the Acheson Graphite Corporation in exchange for shares of its own stock.

* * * *

A Franklin Medal has been awarded by the Franklin Institute of Philadelphia to Professor W. Nernst, of Berlin, in recognition of his numerous valuable contributions to the advancement of physical and theoretical chemistry.

* * * *

Belgian production of ammonium sulphate has been increasing during recent years. A new plant was opened at Ostend a few months ago with a productive capacity of 4,500 tons a year. At Selzaete another plant is under construction, with a similar capacity, while a Claude plant with a capacity of 3,000 tons of sulphate per annum has been in operation for two years, near Liege. Production has risen in the last four years from 61,800 metric tons to 81,450 metric tons, and consumption from 44,500 metric tons to 101,600 metric tons.

New Technical Books

ELEMENTARY INORGANIC CHEMISTRY. By Sylvanus J. Smith Pp. 395. London: Macmillan and Co., Ltd., 4s. 6d.

This book is intended primarily for a two years' course to reach the standard of School Leaving Certificate examinations; in particular, the requirements of the University of London and of the Northern Universities Joint Board have been considered. A number of books of introductory chemistry now include simple ideas of atomic theory as applied to the representation of chemical reactions by means of symbols and equations. Any useful extension of this work, however, demands a somewhat full discussion of atomic and molecular theory, and the present author has felt justified in introducing a number of simple equations before discussing their rigid construction and full quantitative significance. He has also tried to bear in mind the needs of what are becoming to be regarded as two distinct types of student, namely, the student who will proceed to an advanced science course, and the student who will discontinue his chemistry after taking his School Leaving Certificate.

UTILISATION OF FATS. By H. K. Rean. Pp. 292. London: A. Harvey. 15s.

It is some years now since a book, written in English, covered the field of fats. The present author has attempted to summarise the important additions which have been made to our knowledge of fat chemistry and fat technology during the last ten years. He points out that notable advances have occurred in refining, in the treatment of drying oils, and in the transformation of fatty materials to wetting agents and detergents, and continuous methods have become a particular feature of fat technology. The physico-chemical approach to fat problems is being increasingly utilised at the present time and in giving a brief survey of some of the methods and results, the explanations of various phenomena offered by physical chemistry, which are too often overlooked in textbooks on fats, have been given due consideration. The primary consideration, however, has been to present a clearer picture of the relation of structure of fats to their utilisation. This has been achieved largely as a result of the replacement of the usual tables of iodine, saponification and other average values, and the classification based upon them, by tables showing the composition of fats in terms of fatty acids, and where possible, glycerides. This conversion has been greatly facilitated by the accumulation of a large number of accurate analyses. As a result, chemists are now able to envisage the biochemical synthesis and technical application of fats from the standpoint of structure, rather than general characteristics. This change of viewpoint is a notable advance and enables a rational classification to be adopted. By the inclusion of the fat-soluble vitamins, the biochemistry of fats, latest methods of analysis, and a large number of references, this book will appeal to a wide circle of readers. The author has obtained much help and information from sources mentioned in the sectional bibliographies.

GENERAL CHEMISTRY. By Eugene P. Schoch and William A. Felsing. Pp. 524. London: McGraw-Hill Publishing Co., Ltd. 18s.

This book has not been written from a descriptive or encyclopaedic point of view; in fact some teachers may complain of the scarcity of such dictionary-like information. The presentation of the text is based upon chemical principles, with just enough descriptive material to furnish a basis for generalisations. After a short introduction to the subject, chemical reactions are presented in two distinct groups: (a) those involving no change in valence (or metathetical reactions), and (b) those involving a change in valence (or oxidation-reduction reactions). These two classes of reactions involve different fundamentals. Thus the reactions of the first group depend primarily upon the solubilities and the degrees of activation and of ionisations of electrolytes, while the reactions of the second group depend primarily upon the relations between the electromotive forces of half-cells. In addition to the inorganic reactions, which constitute the major portion of the book, there are two chapters on elementary organic reactions, largely descriptive and inserted to aid in the attempt to present a complete picture of chemistry to the student who takes only one course. An attempt has been made to enhance the student's interest in the subject by interposing relevant remarks concerning industrial applications. An abbreviated scheme of qualitative analysis has been introduced for the sake of creating interest. Laboratory directions are interspersed with the main portions of the text, because the author is convinced that the significance of experimental work should be clearly before the student while he is doing laboratory work; laboratory exercises have no justification unless they serve to verify the statements made, or to clarify with factual material the orderly development of the subject.

A LABORATORY MANUAL OF QUALITATIVE ANALYSIS. By John H. Yoe. Pp. 219. New York: John Wiley and Sons, Inc. London: Chapman and Hall, Ltd. 12s. 6d.

This book is strictly a laboratory manual, intended to accompany the author's book "Chemical Principles," with particular application to qualitative analysis. Although an introductory part on theory has been omitted, great care has been taken to follow each procedure with detailed explanations. At the end of each group of metals and of acid radicals, as well as at the end of Parts I, IV, and V, extensive lists of questions and exercises have been added. In Part I is given an outline of the course; Part II is devoted to the systematic analysis of cations; Part III to anion analysis. Part IV covers the use of organic reagents in inorganic analysis, intended to serve as supplementary tests for the cations. One or more sensitive organic reagent is given for most of the common cations. In order to facilitate the use of the organic reagents, each procedure in the cation analysis is marked at the place where the supplementary tests may be applied. Part V, on analysis by dry methods, has been taken from the author's "Chemical Principles."

THE CHEMICAL ANALYSIS OF FOODS. By Henry Edward Cox. 2nd Edition. Pp. 329. London: J. and A. Churchill, Ltd. 21s.

The last ten years has witnessed rapid advance in the chemistry of food. So far as analysis is concerned this has been particularly noticeable in the development of methods for the determination of important constituents which are present in small quantity, and also in respect of traces of various impurities. Taking advantage of an opportunity for a thorough revision of the first edition, the author of this book has given particular attention to methods for the determination of preservatives, metallic impurities, fluorides, and substances such as ascorbic acid and enzymes, which though small in quantity are dietetically important. The useful Lane-Eynon method for sugars has been included, with the necessary tables; also the Reichert-Polenske-Kirschner process as now standardised, and the Hortvet process. Advantage has also been taken of the good work done by the Society of Public Analysts' Committee on Condensed Milk, and more detail is given about jams and jam standards, meat and fish products, milk (including new designations), dried milk, eggs, infant foods and various food fats. An increase in the size of the volume, which would have been necessitated by the inclusion of much new matter, has been avoided by changes in the type and make-up of the pages.

References to Current Literature

Inorganic

Anodic formation of alkili chlorates. Lowry, *Chim. et Ind., 40,* 31-32 T.

Titanium silicides. Alexander, *Metals Alloys, 9,* 179-181.

Platinum-rhodium catalyst in the production of nitric acid. Carter, *L'Ind. Chim., 25,* 441-442.

Symposium on potash. *Ind. Eng. Chem., 30,* 853-896.

Preparation of the rare earths. Prandtl, *Z. anorg. Chem., 238,* 321-334.

Organic

Synthesis and hydrogenation of polyalkyl benzenes. Koch and Steinbrink, *Brennstoff Chem., 19,* 277-285.

Polymerisation of isobutylene. Steacie and Shane, *Canadian J. Research, 16,* B, 210-212.

Distyrenes. Marion, *Canadian J. Research, 16,* B, 213-217.

α- and β-naphthoic acids. Wahl, *Rev. Générale Matières Colorantes, 42,* 285-286.

Modified starches. Jambusawala, *J. Text. Inst., 29,* T., 149-160.

Researches in the pyridine and quinoline series. Rabe, *J. prackt. Chem., 151,* 65-81.

Chemistry of the terpenes. Dulou, *Chim. et Ind., 40,* 3-18 T.

Reaction between benzene and hydrogen peroxide. Ono, Oyamada and Katuragi, *J. Soc. Chem. Ind. Japan, 41,* 209 B.

Analysis

Analysis of pyrethrum. Fischer, *Z. analyst. Chem., 113,* 1-7.

Identification of alkaloids. Jackson, *Ind. Eng. Chem. analyt. ed., 10,* 380-381.

Zinc oxide analysis. Remington, *Paint Manuf., 8,* 213-215.

Determination of free alkali in coloured wax emulsions. Nitsche, *Ole Fette Wachse,* 1938, No. 6, 1-3.

Isopropyl alcohol in free fatty acid titration. Worthen Agee, *Oil and Soap, 15,* 189-191.

Determination of boron in steel. Kar, *Metals Alloys, 9,* 175-178.

Chemical analysis of fire-resistant substances. Kall, *Sprechsaal, 71,* 381-384.

Colorimetric determination of aluminium. Millner, *Z. analyt. Chem., 113,* 83-119.

Gravimetric method for palladium determination. Schöntal, *J.C.S.,* 1099-1100.

Determination of organic sulphur in gas. Wilson and Kemper, *Ind. Eng. Chem. analyt. ed., 10,* 418-419.

Determination of sulphur in common alloys. Silverman, *Ind. Eng. Chem. analyt. ed., 10,* 433.

Mineral Oils, Gas, Tar

Equilibrium constants for light hydrocarbons. Sage, Hicks and Lacey, *Refiner, 17,* 350-358.

Refining of petroleum products. Kwal, *Petroleum Eng., 9,* 33-36.

Cold- and water-resistance of alcohol fuels. Heinze, Marder and Elsner, *Angew. Chem., 15,* 524-526.

Chemical trends in the petroleum industry. Frolich, *Ind. Eng. Chem., 30,* 916-922.

Artificial ageing of hydrocarbon oils. Kadmer, *Chem. Ztg., 62,* 611-613.

Cellulose, Paper

Absorption of vapours by cellulose and its derivatives. Kanamaru and Chao, *Kolloid Z., 84,* 85-99.

Fermentation of cellulose. Berl and Koerber, *J. Amer. Chem. Soc., 60,* 1596-1598.

Alcohol and sugar from cellulose and wood. Proboscht, *Z. Papier Pappe Zell Holzstoff, 56,* 181-184.

Action of organic solvents on cellulose acetate. Bluma, *Rev. Générale Matières Plastiques, 14,* 193-199.

Mechanical pulp process. Kanamaru, *J. Soc. Chem. Ind. Japan, 41,* 182-191 B.

Bleaching, Dyeing, Finishing

Tests for water-repelling impregnations. Stenzinger, *Amer. Dyestuff Rep., 27,* 407-411.

Textile testing; chemical. *Skinkle, Amer. Dyestuff Rep., 27,* 412, 422-427.

Indigo. Van Alphen, *Rec. Trav. Chim. Pays-Bas, 57,* 837-846, 911-920.

Cuprammonium artificial silk. Höllwig, *Papier Fabrik. (techn. Teil), 36,* 325-330.

Diazosulphonates in textile printing. Desai, Mehta and Thosar, *J. Soc. Dyers Colourists, 54,* 371-381.

Determining the class of dyestuff on the fibre. Fabrini, *Teintex, 3,* 462-468.

Proteins in textile chemistry, Wakelin, *Text Colorist, 60,* 515-517.

Glass, Ceramics

Zirconium compounds as turbidifying agents for glazes. Loffler, *Ber. Deutschen Keram. Ges., 19,* 228-234.

Potash in the glass industry. Finn, *Ind. Eng. Chem., 30,* 891-892.

Metals, Electrometallurgy

Diffusion of hydrogen in iron. Bankloh and Hoffmann, *Metalwirtschaft, 17,* 655-657.

Age-hardening of aluminium-copper alloys. Calvet, Jacquet and Guinier, *Compt. rend., 206,* 1,922-1,874.

Galvanoplastic metal deposits. *Metallwaren Ind. u. Galvano-Techn., 33,* 301-302.

Determining corrosion resistance of tin plate. Vanrio, Clark and Lueck, *Ind. Eng. Chem. analyt. ed., 10,* 368-374.

Extraction of oxide inclusions in high carbon iron. Scott, *Metals Alloys, 9,* 171-174.

Antimony-tin alloys. Hanson and Pell-Walpole, *Monthly J. Inst. Metals, 5,* 309-333.

Refined aluminium. *Light Metals, 1,* 250-253.

Röntgenographic testing in practice. Stintzing, *Metallwirtschaft, 17,* 761-771.

Active aluminium obtained by electrolysis. Chrétien and Bisch, *Compt. rend. 207,* 237-239.

Porosity of galvanic deposits. *Metallwaren Ind. u. Galvano-Techn., 33,* 323-327.

Steels for synthetic petrol plant. Naumann, *Chem. Fabrik, 11,* 365-376.

Fats, Oils, Waxes

Iodine value of tung oil. Von Mikusch, *Oil and Soap, 15,* 186-188.

Beeswax industry. De Keghel, *Rev. Produits Chim., 41,* 420-422.

Prevention of corrosion in soap manufacture. Matagrin, *L'Ind. Chim., 25,* 435-441.

Synthesis of fatty acids by oxidation of hydrocarbons. Wietzel, *Angew, Chem., 51,* 531-537.

Shaving soaps and creams. Pfaff, *Soap Perfum. Cosmetics, 11,* 700-704.

Paste soaps. Dennison, *Soap, 14,* No. 8, 19-21, 41.

Transparency of soaps. *Seifensieder Ztg., 65,* 545-548.

Rubber, Plastics

Rubber calendering. Young, *Rubber Age, 19,* 158-163.

Polystyrene resins. Daubenton, *Rev. Générale Matières Plastiques, 14,* 183-187.

Extensibility curves of vulcanised rubber. Hank and Neumann, *Monatshafte f. Chem., 72,* 22-30.

Automobile rubber developments. Winkelmann, *Rubber Age (U.S.A.), 43,* 223-225.

Synthetic rubber from acetylene. Hurukawa and Nakamura, *J. Soc. Chem. Ind. Japan, 41,* 198-200B.

Latex. Partisch, *Seifensieder Ztg., 65,* 407-499, 517-519.

Phenol resins. Seebach, *Chem. Ztg., 62,* 569-571.

Mixed accelerators in latex compounding. Sibley, *Trans. Inst. Rubber Ind., 13,* 453-471.

Miscellaneous

Cellulose as adhesives and binding agents. Wulf, *Farben Ztg., 43,* 752-754.

Boiling temperatures of mixtures of water and alcohol. Vidal, *Bull. Assoc. Chim., 55,* 554-564.

Personal Notes

MR. P. G. ASHMORE has been awarded a research scholarship in chemistry for one year by Emmanuel College, Cambridge.

MR. JAMES M'COWAN, of Alexandria, has just retired after being employed at the Alexandria works of the United Turkey Red Co., Ltd., for 70 years.

MR. HORACE JOYNES, works manager for Chance and Hunt, Ltd. (I.C.I.), at Tillington salt works, Stafford, has accepted the official invitation for election as Mayor of Stafford.

MR. E. COLLINS, F.I.C., who has been a member of the Liverpool City Analyst's staff for the last four years, has been appointed to the post of Government Chemist for Mauritius.

DR. WILLIAM HARFORD WILLOTT, an official at the Mond nickel works, Clydach, South Wales, was married to Miss Beryl Margaret Walters, at Swansea, on August 27. Dr. Willott's father, Mr. F. J. Willott, is a process manager at Clydach.

MR. T. E. HUDSON, an ex-Mayor of Darlington, has sold his financial interests in the old-established chemical works of Parkin, Ness and Co., Ltd. He will, however, continue his intimate association with the firm. He has sold his interests to a group of business men well known in the North of England.

GENERAL SIR HUGH ELLES has been appointed one of the British delegates on the International Sugar Council in succession to Lt.-Col. Francis Balfour, who has resigned. The appointment will date from September 1. General Elles, who is 58, was Master General of Ordnance, War Office, from 1934 until December last.

MR. H. MAKEY, general manager of the Shell Refineries at Ellesmere Port for 16 years, will leave at the end of this year in order to take up a new appointment. Mr. Makey has been in his present position since the construction of the installation was commenced, and under his managership Stanlow has become the largest oil dock in the United Kingdom.

THE RT. HON. OLIVER STANLEY will be the principal guest at the annual dinner of the Association of British Chemical Manufacturers, at Grosvenor House, London, on October 13, under the presidency of Mr. E. B. Evans. Others who have accepted invitations include the High Commissioner for India, SIR DUNCAN WILSON; SIR PERCY ASHLEY; SIR ROBERT PICKARD; and WING COMMANDER HODSOLL, of the Air Raids Precautions Department.

OBITUARY

MR. ALFRED JOHN GREENAWAY, who in 1885 became sub-editor of the *Journal of the Chemical Society*, under Groves, Wynne, Morgan and Cain, dealing chiefly with the Abstracts, died on August 25, at the age of 86, after a long illness. In 1921 he succeeded Cain as editor of the Chemical Society's publications, and resigned at the age of 71. An original member of the Institute of Chemistry, Mr. Greenaway served on the council 1892-95 and 1902-05. He also served on the council of the Chemical Society as vice-president, 1924-27. He was educated at the Royal College of Chemistry, Oxford Street, under Frankland, moving to South Kensington when it developed into the Royal College of Science, where for nine years as a demonstrator he taught in the chemical laboratories.

MR. JAMES O'SULLIVAN, head chemist to Bass and Co. until he retired in 1922, has died at Bournemouth at the age of 83. He was trained at the Royal College of Science, South Kensington, and went to Burton-on-Trent in the late seventies to succeed his brother, Mr. Cornelius O'Sullivan as head chemist to Bass and Co. He was a member of the Institute of Brewing and a Fellow of both the Institute of Chemistry and the Chemical Society.

MR. HAMPDEN BECKETT, managing director of J. M. Beckett and Son, Ltd., colour and chemical manufacturers, of Deansgate, Manchester, and Biddulph, Stoke-on-Trent, died at his home Kenmure, Aigburth, Liverpool, on August 25, from heart failure. He was fifty-nine years of age and had only returned from a visit to New York on August 22. Mr. Beckett was born in Manchester, and was educated at Rossall School, Fleetwood, and Manchester University. He lived for many years in Buxton. In 1901 he succeeded his father as managing director of the business started by his grandfacter in 1849 at Miles Platting, Manchester.

MR. ARTHUR WHITBY, who was at one time engaged in research work at the laboratories of Southalls', manufacturing chemists, at Birmingham, now known as Southall Bros. and Barclay, died recently in South Africa. At Birmingham he had success in research connected with the isolation of quinine from its related alkaloids. Mr. Whitby went to South Africa in 1895 for reasons of health and was first engaged in pharmaceutical work, but in 1896 he joined the cyanide works of the Wolhuter Co., and subsequently worked as assayer to the Meyer and Charlton Co. and to Robinson Deep, Ltd. He made extensive investigations of the accuracy of slime residue and solution assays and evolved the copper sulphate method of precipitation. At the time of his death he was a partner of Littlejohn and Whitby, public analysts and assayers.

Foreign Chemical Notes

Lithuania

A LARGE-SCALE PLANT FOR PRODUCING INDUSTRIAL GAS from peat was recently put into operation.

Hungary

PLANS ARE UNDER CONSIDERATION for construction of a pipeline from the Lispe oilfield to Budapest.

Latvia

EXPERIMENTS ON THE PRODUCTION OF CASEIN WOOL are now engaging the attention of several concerns with a view to eventual establishment of a factory.

Poland

NON-SPLINTERING GLASS will be turned out from a factory to be erected in the vicinity of Sandomir by a company in process of formation at Petrikau.

Germany

THE ESSENTIAL OIL-MANUFACTURING CONCERN, Heine & Co., A.G., of Leipzig, reports an increased net profit of 188,000 marks in the last trading year (previous figure 149,000 marks) and has increased the dividend on the ordinary shares to 5 per cent. (3 per cent.), while that on the preference shares is unchanged at 6 per cent.

From Week to Week

T. AND H. SMITH, LTD., are to build an electric sub-station at Blandfield Chemical Works, Wheatfield Road, Edinburgh.

GERMANY'S CRUDE STEEL PRODUCTION during July increased by 91,000 tons, to 1,887,000 tons. Oil production increased by 2,822 tons, to 49,897 tons.

THE INTERNATIONAL BUILDING CLUB has opened premises at 141 Park Lane, London, W., for those whose interests are associated with the building industry.

BRITISH INDUSTRIAL PLASTICS, LTD., has acquired a controlling interest in Croydon Plastics, Ltd., a company making moulded buttons for men's wear.

HUGH MACLEAN AND SONS, of Shieldhall, Glasgow, have received a contract from the Anglo-Iranian Oil Co., for seven teak launches to be used on the River Euphrates to obviate journeys by road.

A STUDENT'S GUIDE TO EDUCATION IN CHEMISTRY in the district and in and around Manchester has been published by the Regional Advisory Council for technical and other forms of further education.

THE TOTAL QUANTITY OF SUGAR manufactured in Great Britain from home-grown beet during the 1937-38 campaign was 7,819,224 cwt., according to the Ministry of Agriculturer's Market Report for August.

THE COKE-OVEN AND BY-PRODUCT WORKS at Marley Hill, Co. Durham, belonging to John Bowes and Partners, Ltd., have been purchased by Derwent Metals, Ltd., Newcastle, and Marple and Gillott, Ltd., of Gateshead and Sheffield, for dismantling. The work will occupy about 18 months.

HENRY BALFOUR AND CO., LTD., have just issued a brochure dealing with "Samka" speciality equipment which they manufacture under licence. Samka pipe and double wall constructions enable the highest steam pressures to be used, and in both cases the wall thickness of the inner vessel can be restricted to the least dimensions.

THE FOREIGN TRADE OF AMERICA in July showed a favourable balance of £17,800,000, compared with only £600,000 in July, 1937. Exports amounted to £46,800,000, against £55,600,000, and imports £29,000,000, against £55,000,000. For the seven months ended July 31, exports totalled £370,000,000, against £360,949,000, and imports £228,000,000, against £400,000,000.

THE NEW SESSION of the Sir John Cass Technical Institute, Jewry Street, Aldgate, London, E.C.3, which extends over about 36 weeks, will commence on September 26, and students will be enrolled on and after September 21. The Institute provides evening instruction in pure and applied mathematics, physics, chemistry, bacteriology, petroleum technology, fuel technology (including coal carbonisation and gas engineering), chemical engineering, metallurgy, assaying, and modern languages, among other subjects.

DURING THE FIRST HALF of the current year 45,390 tons of petrol were sold on the Polish market. The record figure of petrol consumption in Poland before the depression was 38,665 tons—during the first half of 1930; consumption decreased to 27,742 tons during the first half of 1936 and to 34,334 tons during the corresponding period of 1937. Polish petroleum refineries produced 49,941 tons of petrol during the first six months of this year, against 45,829 tons during the corresponding period of last year. In July 43,184 tons of crude oil were extracted in the Polish oilfields, against 41,924 tons in June.

THE RAPIDITY WITH WHICH INTERNATIONAL TRADE DECREASED in the beginning of the current year was not repeated in the second quarter, according to official German statistics, states Reuter from Berlin. Whereas the drop during the first quarter compared with the last three months of 1937 amounted to 13.8 per cent., the loss in the second quarter compared with the first quarter was only 5.8 per cent. The total world turnover in the first quarter was about £2,190,000,000, and in the second quarter about £2,070,000 000. Compared with the first quarter, Great Britain's exports dropped in the second quarter by 7.4 per cent., Germany's by 5.9 per cent., and France's by 10.9 per cent. The imports for these countries also fell by 9.7 per cent., 4.7 per cent., and 11.8 per cent. respectively.

A NEW BIBLIOGRAPHY of the literature of explosives is being made available by the United States Bureau of Mines. Dr. Charles E. Munroe, when chief chemist of the Explosives Division of the Bureau of Mines, gave extensive consideration to the literature of explosives. He retired from the active service of the Bureau of Mines before he could provide his manuscript bibliography with author and subject indices. To make copies available to those interested, Dr. John W. Finch, director of the Bureau of Mines, has now arranged with the American Documentation Institute, 2101 Constitution Avenue, N.W., Washington, D.C., to prepare these on microfilm, and copies may be secured on order from the Institute if specified as Document No. 1137, mentioning the name of the author and the subject matter.

THE SECOND CARGO OF HERRING SALT to be shipped from the Mediterranean for the East Anglian season arrived at Yarmouth last week. The salt, 2,200 tons, came from Cagliari, Sardinia.

PINCHIN JOHNSON AND CO., paint manufacturers, have added to their existing group life insurance scheme a pension plan, which, like the former scheme, has been placed for administration with the Eagle Star Insurance Co.

THE LEVANT SAMPLES FAIR will be held at Bari, Italy, September 6 to 21. There will be 5,000 exhibitors from 42 nations and more than 1,000,000 visitors are expected. A new feature is an international exhibition of electrotechnics.

THE 1,450 OPERATIVES EMPLOYED BY COURTAULDS, LTD., at their Brook and Bedford new mills, Leigh, ceased work on August 27 at noon owing to trade depression, and will not resume until Thursday, September 15, a holiday of nearly three weeks.

THE CONSTRUCTION OF THE SEAWEED UTILISATION FACTORY at North Boisdale, Island of South Uist, has been delayed owing to difficulties connected with the plant. The factory, which was to have been in operation by September, is being set up for the manufacture of transparent foil for wrapping merchandise.

SCOTTISH STEEL OUTPUT DURING JULY was 74,300 tons, against 136,000 tons for June and 104,700 tons for July, 1937. The figure for the local pig-iron output was 27,900 tons, compared with 34,300 tons during the previous month and 39,600 tons in July, 1937. Only nine furnaces are in operation, compared with a recent total of 16.

THE WHALE-OIL PRODUCTION of the world's pelagic expeditions (excluding land stations) in the 1937-38 season was 3,132,875 barrels, the total number of whales caught was 43,135 and the yield of oil per calculated blue whale was 111 barrels. The 10 expeditions under the British flag caught 15,280 whales, yielding 1,097,977 barrels of oil, an average of 112.1 barrels per estimated blue whale.

THE 433 REGISTERED TRADE UNIONS of Great Britain possessed funds amounting to £18,141,450 at the end of last year. This figure, almost twice the amount in the 487 unions ten years ago, is disclosed in the statistical summary issued last night by Mr. John Fox, chief registrar of friendly societies. Increased membership was shown in every group with the exception of fishing.

THE LONDON OFFICE AND WORKS of the Spiral Tube and Components Co., Ltd., will be removed on September 5 to new modern premises at Honeypot Lane, Stanmore, Middlesex. (Telephone: Edgware 4658/9. Telegrams: Spiratucom, Phone, London.) The company's works at Osmaston Park Road, Derby, have been enlarged. The telephone numbers are changed to Derby 46067/8. (Telegrams: Spiral Derby 46067.)

TO SERVE THE NEW SHALE OIL FIELDS now in course of development in the Newnes area and other parts of New South Wales, a steel pipe line is to be laid down over a length of 140 miles from the oil bearing areas to a refinery on the outskirts of Sydney. Three different oil companies will be concerned in the work of shale oil production, and will co-operate with the National Oil Co., the original organisation formed to develop the deposits.

THE AUSTRALIAN TARIFF BY-LAW ADVISORY COMMITTEE will meet on October 3 to consider a request for removal from By-Laws of (1) menthol (dutiable under Tariff Item No. 404) and (2) vitamin "B" in the form of brown coloured viscous paste and Ryzamin "B" (dutiable under Tariff Item No. 285 (B)), according to the *Board of Trade Journal*. If removed from By-Law, these commodities would be dutiable under Tariff Items Nos. 281 (M) and 285 (A) respectively. Any United Kingdom firms or Trade Associations interested in these references to the Tariff By-Law Advisory Committee should communicate immediately with the Department of Overseas Trade, 35 Old Queen Street, London S.W.1. (Reference No. 17682/37 should be quoted.)

New Companies Registered

Toja Products, Ltd. 343,728.—Private company. Capital, £100 in 100 ordinary shares of £1 each. To carry on the business of soap manufacturers, manufacturers of and dealers in all kinds of oils and oleaginous and saponaceous substances, etc. Subscribers: Dudley D. C. Giddins, The Lodge, Shellow Cross, Willingale, Essex; Edward S. Beckett.

R. B. Lowe (Birmingham), Ltd. 343,804.—Private company. Capital, £500 in 500 shares of £1 each. To carry on the business of dealers in and refiners of precious and base metals, smelters of ores, sweeps and residues, assayers, refiners and analytical and metallurgical chemists, etc. Directors: Ronald B. Lowe, Three Horse Shoes, Poolbrook, Malvern; Sidney B. Timbrell. Registered office: 208 Moseley Street, Birmingham.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

PROCESS OF HYDROCARBON OIL CONVERSION.—Naamlooze Vennootschap Nieuwe Octrooi Maatschappij. (United States, Sept. 28, '37.) 23867.

PROCESS OF INCORPORATING PHOSPHATIDES INTO PASTE WARES, ETC.—M. F. Niescher. (Germany, Sept. 10, '37.) 24065.

PRODUCTION OF POLYMERISATION PRODUCTS.—Röhm and Haas, A.-G. (Germany, Sept. 29, '37.) 23743.

PROCESS FOR IMPROVING OILS.—H. Rostin. 23766.

METHOD OF CURLING, ETC., CELLULOSE WOOL produced from viscose.—Schlesische Zellwolle, A.-G. (Germany, Aug. 23, '37.) 24066.

PRODUCTION OF XANTHOGENATE SOLUTIONS, ETC.—Schlesische Zellwolle, A.-G. (Germany, Aug. 17, '37.) 24067.

HIGH QUALITY ALLOYS, ETC.—Seri Holding Soc. Anon. (Italy, Dec. 29, '37.) 23882.

POLYVINYL ACETAL RESINS, ETC.—Shawinigan Chemicals, Ltd. (United States, Aug. 13, '37.) 23788.

MANUFACTURE OF AMINOHYDRAZINES.—Soc. of Chemical Industry in Basle. (Switzerland, Aug. 14, '37.) 23712.

MANUFACTURE OF ALCOHOLS of the saturated, etc., cyclopentanopolyhydrophenanthrene series, etc.—Soc. of Chemical Industrie in Basle. (Switzerland, Aug. 16, '37.) 23713; (Switzerland, June 8.) 23714.

MANUFACTURE OF DERIVATIVES of the saturated, etc., cyclopentanopolyhydrophenanthrene series.—Soc. of Chemical Industry in Basle. (Switzerland, Aug. 12, '37.) 23710; (Switzerland, July 15.) 23711.

ACCELERATING THE AGEING OF VISCOSE.—Thuringische Zellwolle, A.-G. (Germany, Aug. 14, '37.) 24017.

CHEMICAL SOLIDIFICATION OF LOOSE, ETC., MASSES.—Tiefbau- und Kalteindustrie, A.-G., vorm. Gebbardt and Koenig, Nordhausen. (Germany, Aug. 16, '37.) 24168.

PROCESS, ETC., FOR THE LOW-TEMPERATURE DISTILLATION OF COAL, ETC.—V. H. A. Syndicate, Ltd., and C. van. Hoestemberghe. 23834.

PRODUCTION OF SODIUM OXALATE from sodium salts, etc.—G. N. White. 23816.

PROCESS, ETC., FOR THE RECONDITIONING OF LYES of the cellulose industry, etc.—G. Zotos. 23893.

ART OF RECLAIMING REAGENT.—Aerovox Corporation. (United States, Feb. 23.) 24892.

MANUFACTURE OF ESTERS.—A. G. Bloxam (Soc. of Chemical Industry in Basle). 24920.

TREATMENT OF SULPHITE WASTE LIQUOR.—Böhm Krumauer Maschinenpapierfabriken I. Spiro et Söhne, A.-G., and L. Hahn. 24689.

PRODUCTION OF AMIDINES, ETC.—Boots Pure Drug Co., Ltd., F. L. Pyman, and H. H. L. Levene. 24934.

MANUFACTURE OF COATED CELLULOSE HYDRATE SHEETS, ETC.—British Cellophane, Ltd. (Germany, Aug. 23, '37.) 24705.

MEANS FOR OBTAINING PRECIOUS, ETC., METALS from their ores. J. L. Burnett. 24864.

PROCESS FOR THE PURIFICATION OF ZINC SALT SOLUTIONS.—A. Carpmael (I. G. Farbenindustrie.) 24509.

POLYMERISATION OF ACRYLIC and methacrylic compounds.—E. I. du Pont de Nemours and Co. (United States, Aug. 21, '37.) 24514.

Complete Specifications Open to Public Inspection

PROCESS FOR THE PREPARATION OF A THIAZOLIUM SALT.—K. Merck, L. Merck, W. Merck, and F. Merck (trading as E. Merck (firm of)). Feb. 22, 1937. 35510/37.

PROCESS FOR THE PRODUCTION OF RESOLS.—A. Nowack, A.-G., and R. Hessen. Feb. 17, 1937. 1531/38.

FLUORESCENT CALCIUM WOLFRAM ORE.—Degea, A.-G. (Auerges.). Feb. 9, 1937. 3181/38.

PROCESS FOR THE PREPARATION OF DERIVATIVES OF OESTRADIOL. Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Reszvenytarsasag. (Kereszty and Wolf). Feb. 17, 1937. 3822/38.

PROCESS FOR THE PRODUCTION OF LIGHT-SENSITIVE MATERIALS for colour-photographic purposes.—B. Gaspar. Feb. 20, 1937. 4010/38.

COATING COMPOSITIONS and method of preparing same.—Plaskon Co., Inc. Feb. 17, 1937. 4337/38.

MANUFACTURE OF PLASTIC MASSES.—Deutsche Celluloid-Fabrik, A.-G. Feb. 18, 1937. 4346/38.

METHOD OF PURIFYING AND REGENERATING GREASY WASTE WATERS. A. De Vreese. Feb. 19, 1937. 4349/38.

MANUFACTURE OF TETRACHLORETHYLENE.—Dr. A. Wacker Ges. Fur Elektrochemie Industrie Ges. Feb. 22, 1937. 4549/38.

SEPARATION OF PROPANE and propylene from gas mixtures.—I. G. Farbenindustrie. Feb. 16, 1937. 4572/38.

PROCESS FOR RECOVERING ACETYLENE from acetylene-containing gases.—Ruhrchemie, A.-G. Feb. 20, 1937. 5326/38.

MAGNESIUM ALLOYS.—Compagnie de Produits Chimiques et Electrometallurgiques Alais, Froges, et Camargue. Feb. 16, 1937. 4694/38.

LEAD-CHROMATE PIGMENTS and their manufacture.—E. I. du Pont de Nemours and Co. Feb. 20, 1937. 5480/38.

METHOD OF PURIFYING PHYSIOLOGICALLY-ACTIVE LIPOIDS.—I. G. Farbenindustrie. Feb. 22, 1937. 5551/38.

COMPOSITIONS COMPRISING CELLULOSE ESTERS or cellulose ethers.—I. G. Farbenindustrie. Feb. 22, 1937. 5581/38.

Specifications Accepted with Dates of Application

MANUFACTURE OF ARTIFICIAL STRUCTURES and other useful articles from cellulose derivatives.—L. Lilienfeld. Nov. 11, 1936. 490,510.

REMOVAL OF SULPHUR DIOXIDE from waste gases.—Board of Trustees of University of Illinois. Dec. 23, 1935. 490,512.

MANUFACTURE OF PREPARATIONS FROM BACTERIA.—W. W. Groves (I. G. Farbenindustrie.) Nov. 16, 1936. 490,658.

CONVERSION OF CARBONACEOUS MATERIALS into low-boiling hydrocarbons by treatment at elevated temperatures with hydrogenating gases.—E. Berl. Nov. 18, 1936. 490,662.

MANUFACTURE OF TANNING-MATERIALS.—W. W. Groves (I. G. Farbenindustrie.) Dec. 18, 1936. 490,665.

METALLIC POWDER AGGREGATES.—C. P. Harris. Jan. 18, 1936. 490,520.

MANUFACTURE AND PRODUCTION OF DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) Jan. 26, 1937. 490,744.

MANUFACTURE AND PRODUCTION OF DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 15, 1937. 490,745.

PROCESS FOR THE MANUFACTURE OF 3.4-DICYANODIPHENYL.—I. G. Farbenindustrie. Feb. 20, 1936. 490,681.

MANUFACTURE AND PRODUCTION OF SYNTHETIC RESINS.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 19, 1937. 490,543.

MANUFACTURE OF ALIPHATIC ACIDS.—H. Dreyfus. Feb. 19, 1937. 490,544.

OXIDATION OF STEROLS.—J. R. Myles, and Imperial Chemical Industries, Ltd. Feb. 19, 1937. 490,756.

MANUFACTURE OF WATER-SOLUBLE CONDENSATION PRODUCTS.—I. G. Farbenindustrie. Feb. 21, 1936. (Samples furnished.) 490,764.

MANUFACTURE OF RUBBER CHLORIDE.—Raolin Corporation. March 17, 1936. 490,824.

HYDROGENATION OF POLYMERISATION PRODUCTS of unsaturated hydrocarbons.—H. E. Potts (International Hydrogenation Patents Co., Ltd.). Feb. 23, 1937. 490,768.

MANUFACTURE OF COMPOUND GLASS and other laminated materials.—A. Rosenthal. March 2, 1937. 490,771.

APPARATUS FOR THE CONTINUOUS MANUFACTURE OF SUPERPHOSPHATES or mixed fertilisers.—R. Moritz. (March 17, 1936. (Addition to 458,478.) 490,554.

TEXTILE ASSISTANTS.—Soc. of Chemical Industry in Basle. March 18, 1936. (Samples furnished.) 490,774.

PURIFICATION OF COAL GAS or other fuel gas from sulphur compounds.—E. B. Maxted. March 31, 1937. 490,775.

HARDENING GOLD AND SILVER ALLOYS.—C. H. Coleman. April 20, 1937. 490,561.

PREPARING A CONCENTRATED RUBBER DISPERSION from rubber latex.—Algemeene Vereeniging Van Rubberplanters Ter Oost-Kust Van Sumatra. April 10, 1937. 490,781.

EXTRACTING GLYCERINE from distillery residuel liquors.—Soc. Industrielle de Nouveaux Appareils S.I.N.A. April 28, 1936. 490,783.

MANUFACTURE AND PRODUCTION OF OXIDATION PRODUCTS from paraffin hydrocarbons of high molecular-weight.—G. W. Johnson (I. G. Farbenindustrie.) May 6, 1937. 490,785.

REMOVAL OF ACIDS from boiler feedwater.—Permutit Co., Ltd. May 7, 1936. 490,704.

INCREASING THE WETTING-OUT AND PENETRATING ACTION of strong alkaline solutions.—Chemical Works, formerly Sandoz. June 4, 1936. 490,567.

OBTAINING OF ALUMINIUM of large reactive surface.—E. Radiowerk Schrack, A.-G. July 1, 1936. 490,795.

ZINC ALLOYS.—G. Von Giesche's Erben. Dec. 4, 1936. 490,706.

MANUFACTURE OF ALIPHATIC ESTERS of the dihydro-oestrine series.—Soc. of Chemical Industry in Basle. July 30, 1936. (Samples furnished.) 490,570.

MAGNESIUM ALLOYS.—G. Von. Giesche's Erben. April 15, 1937. 490,712.

MANUFACTURE OF HALOGEN DERIVATIVES of aceto propyl alcohol. Research Corporation. Sept. 1, 1936. 490,571.

DEACIDIFICATION OF LIQUIDS.—Permutit Co., Ltd. Sept. 8, 1936. 490,799.

SOFTENING TEXTILE MATERIALS.—L. S. E. Ellis (Chemical Works, formerly Sandoz). Oct. 27, 1937. 490,637.

MAKING VANILLIN, and the product resulting therefrom.—Marathon Paper Mills Co. March 1, 1937. 490,646.

Weekly Prices of British Chemical Products

TRADE in most sections of the chemical market has followed a satisfactory course during the past week and there has been a fair expansion in the volume of spot and near-delivery transactions. Some of the larger industrial consumers are again calling up their full quotas under existing commitments and a little better interest is being displayed in fresh contract business. Values on the whole remain steady, and there are no important price changes to record. In the coal tar section a fair volume of inquiry has been circulating and some improvement in the market position is anticipated in the near future. Values, if anything, are a little steadier.

MANCHESTER.—Conditions on the Manchester chemical market during the past week have shown little improvement and trading has been quiet in most sections, although deliveries, on the whole, have been moderate. Holiday influences so far as the call for contract supplies is concerned are coming to an end, but an offsetting factor this week has been the general nervousness over the international situation and buyers are disposed to adopt a cautious policy in connection with the placing of new business. In most directions prices are on a steady basis. In the case of the by-products trading continues slow and here and there the tendency of prices is easy.

Price Changes

Falls: Creosote (Manchester); Cresylic Acid, Pale 99/100% (Manchester); Naphthalene, refined (Manchester); Pyridine (Manchester); Glycerine, in tins and drums.

GLASGOW.—Business in chemicals has been very quiet during the week both for home trade and for export. Prices, however, continue very steady at about last week's figures, with no important changes to report.

General Chemicals

ACETONE.—**£45 to £47 per ton.**

ACETIC ACID.—Tech, 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 2s. 6d. per ton d/d Lancs. GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey, £18 10s. per ton, d/d U.K. Fine white, 98%, £17 per ton, d/d U.K.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM DICHROMATE.—8½d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £16 10s. per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £11 10s. per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 3½d. per lb. d/d station in 70-lb. cylinders (1-ton lots).

CHROMETAN.—Crystals, 2⅞d. per lb.; liquor, £13 per ton d/d station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMIC ACID.—10d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—11d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0½d. per lb. MANCHESTER: 1s. 0½d. SCOTLAND: B.P. crystals, 1s. 0½d. per lb.; less 5%, ex store.

COPPER SULPHATE.—£18 5s. per ton, less 2% in casks. MANCHESTER: £18 10s. per ton f.o.b. SCOTLAND: £18 15s. per ton, less 5%, Liverpool, in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £3 17s. 6d. to £4 17s. 6d. per cwt. according to quantity; in drums, £3 10s. 0d. to £4 2s. 6d.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £30; brown, £1 per ton less. MANCHESTER: White, £31; brown, £30.

LEAD, NITRATE.—£32 per ton for 1-ton lots.

LEAD, RED.—£30 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. SCOTLAND: £30 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £30 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—Calcined, in bags, ex works, about £8 per ton. SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—Solid (ex wharf) £5 10s. per ton. SCOTLAND: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 10d. per lb.; powder B.P., 6s. 0d.; bichloride B.P. (corros. sub.) 5s. 1d.; powder B.P. 4s. 9d.; chloride B.P. (calomel), 5s. 10d.; red oxide cryst. (red precip.), 6s. 11d.; levig. 6s. 5d.; yellow oxide B.P. 6s. 3d.; persulphate white B.P.C., 6s. 0d.; sulphide black (hyd. sulph. cum sulph. 50%), 5s. 11d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

POTASH CAUSTIC.—Solid, £35 5s to £40 per ton according to quantity, ex store; broken, £42 per ton. MANCHESTER: £38.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4½d. per lb. MANCHESTER: £37 per ton.

POTASSIUM DICHROMATE.—5½d. per lb. carriage paid. SCOTLAND: 5½d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 10¾d. to 11¾d.

POTASSIUM PRUSSIATE.—6½d. per lb. SCOTLAND: 6¾d. net, in casks, ex store. MANCHESTER: Yellow, 6½d. to 6¾d.

PRUSSIATE OF POTASH CRYSTALS.—In casks, 6¾d. per lb. net, ex store.

SALAMMONIAC.—Firsts lump, spot, £42 17s. 6d. per ton, d/d address in barrels. Dog-tooth crystals, £36 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

Salt Cake.—Unground, spot, £3 11s. per ton.
Soda Ash.—58% spot, £5 17s. 6d. per ton f.o.r. in bags.
Soda, Caustic.—Solid, 76/77° spot, 13s. 10s. per ton d/d station. **Scotland**: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.
Soda Crystals.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
Sodium Acetate.—£19-£20 per ton carriage paid North. **Glasgow**: £18 10s. per ton net ex store.
Sodium Bicarbonate.—Refined spot, £10 15s. per ton d/d station in bags. **Glasgow**: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. **Manchester**: £10 15s.
Sodium Bisulphite Powder.—60/62%, £14 10s. per ton d/d in 2-ton lots for home trade.
Sodium Carbonate Monohydrate.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.
Sodium Chlorate.—£27 10s. to £32 per ton. **Glasgow**: £1 11s. per cwt., minimum 3 cwt. lots.
Sodium Dichromate.—Crystals cake and powder 4½d. per lb. net d/d U.K. with rebates for contracts.
Sodium Chromate.—4½d. per lb. d/d U.K.
4d. per lb. **Glasgow**: 4½d. net, carriage paid.
Sodium Hyposulphite.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. **Manchester**: Commercial, £11; photographic, £15 10s.
Sodium Metasilicate.—£14 5s. per ton, d/d U.K. in cwt. bags.
Sodium Nitrate.—Refined, £8 per ton for 6-ton lots d/d. **Glasgow**: £1 12s. 0d. per cwt. in 1-cwt. kegs, net, ex store.
Sodium Nitrite.—£18 5s. per ton for ton lots.
Sodium Perborate.—10%, 9½d. per lb. d/d in 1-cwt. drums.
Sodium Phosphate.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.
Sodium Prussiate.—½d. per lb. for ton lots. **Glasgow**: 5d. to 5¾d. ex store. **Manchester**: 4½d. to 5¼d.
Sodium Silicate.—£8 2s. 6d. per ton.
Sodium Sulphate (Glauber Salts).—£3 per ton d/d.
Sodium Sulphate (Salt Cake).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. **Scotland**: Ground quality, £3 5s. per ton d/d. **Manchester**: £3 12s. 6d.
Sodium Sulphide.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. **Manchester**: Concentrated solid, 60/62%, £11; commercial, £8 10s.
Sodium Sulphite.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.
Sulphur Precip.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
Sulphuric Acid.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.
Tartaric Acid.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. **Manchester**: 1s. 1¾d. per lb. **Glasgow**: 1s. 1d. per lb., 5%, ex store.
Zinc Sulphate.—Tech., £11 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

Antimony Sulphide.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.
Arsenic Sulphide.—Yellow, 1s. 5d. to 1s. 7d. per lb.
Barytes.—£6 to £6 10s. per ton, according to quality.
Cadmium Sulphide.—3s. 9d. to 4s. per lb.
Carbon Black.—3½d. to 3 15/16d. per lb., ex store.
Carbon Disulphide.—£31 to £33 per ton, according to quantity, drums extra.
Carbon Tetrachloride.—£41 to £46 per ton, according to quantity, drums extra.
Chromium Oxide.—Green, 10½d. to 11d. per lb.
Diphenylguanidine.—2s. 2d. per lb.
India-rubber Substitutes.—White, 4¾d. to 5¼d. per lb.; dark 3¾d. to 4¼d. per lb.
Lamp Black.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.
Lead Hyposulphite.—9d. per lb.
Lithopone.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.
Sulphur.—£9 to £9 5s. per ton. **Sulphur precip.** B.P., £55 to £60 per ton. **Sulphur precip. comm.**, £50 to £55 per ton.
Sulphur Chloride.—5d. to 7d. per lb., according to quantity.
Vermilion.—Pale, or deep, 4s. 9d. per lb., 1-cwt. lots.
Zinc Sulphide.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

Ammonium Sulphate.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1938: November, £7 8s.; December, £7 9s. 6d.; January, 1938, £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.
Calcium Cyanamide.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1938: November, £7 10s.; December, £7 11s. 3d.; January, 1938, £7 12s. 6d.; February, £7 13s. 9d.; March, £7 15s.; April/June, £7 16s. 3d.
Nitro Chalk.—£7 10s. 6d. per ton up to June 30, 1938.
Sodium Nitrate.—£8 per ton for delivery up to June 30, 1938.
Concentrated Complete Fertilisers.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.
Ammonium Phosphate Fertilisers.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

Benzol.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 8d. to 1s. 8½d. **Glasgow**: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d. **Manchester**: Pure, 1s. 8d. per gal.; crude, 11½d. to 1s. per gal.
Carbolic Acid.—Crystals, 7½d. to 8½d. per lb., small quantities would be dearer; Crude, 60's, 1s. 10½d. to 2s. 1½d.; dehydrated, 2s. 6d. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.
Creosote.—Home trade, 4¾d. per gal., f.o.r. makers' works; exports 6⅜d. to 6¾d. per gal., according to grade. **Manchester**: 4½d. to 5d. **Glasgow**: B.S.I. Specification, 6d. to 6½d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils 5¾d. to 6½d.
Cresylic Acid.—97/99%, 1s. 9d. to 2s.; 99/100%, 2s. 6d. to 3s. 6d. per gal., according to specification; Pale, 99/100%, 2s. 1d. to 2s. 3d.; Dark, 95%, 1s. 7d. to 1s. 8d. per gal. **Glasgow**: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 3s. 9d. to 4s. **Manchester**: Pale, 99/100%, 2s.
Naphtha.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1d. to 1s. 3d. per gal., naked at works, according to quantity. **Glasgow**: Crude, 6½d. to 7¼d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.
Naphthalene.—Crude, whizzed or hot pressed, £5 to £6 per ton; purified crystals, £11 10s. per ton in 2-cwt. bags. **London**: Fire lighter quality, £3 to £4 10s. per ton. **Glasgow**: Fire lighter, crude, £6 to £7 per ton (bags free). **Manchester**: Refined, £13 10s. to £14 10s. per ton, f.o.b.
Pitch.—Medium, soft, 33s. per ton, f.o.b. **Manchester**: 31s. 6d. f.o.b., East Coast. **Glasgow**: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.
Pyridine.—90/140%, 11s. 6d. to 13s. 6d. per gal.; 90/160%, 9s. 6d. to 10s. 9d. per gal.; 90/180%, 2s. 6d. to 3s. 6d. per gal. f.o.b. **Glasgow**: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. **Manchester**: 8s. to 9s. 6d. per gallon.
Toluol.—90%, 1s. 10d. per gal.; pure, 2s. 2d. **Glasgow**: 90%, 120, 1s. 10d. to 2s. 1d. per gal.
Xylol.—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 3d. to 2s. 3½d. **Glasgow**: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

Calcium Acetate.—Brown, £6 15s. to £9 5s. per ton; grey, £8 15s. to £9 5s. **Manchester**: Brown, £8 10s.; grey, £10.
Methyl Acetone.—40.50%, £36 to £38 per ton.
Wood Creosote.—Unrefined, 4d. to 6d. per gal., according to boiling range.
Wood Naphtha, Miscible.—2s. 8d. to 3s. per gal.; solvent, 3s. 3d. to 3s. 6d. per gal.
Wood Tar.—£2 to £8 per ton, according to quality.

Intermediates and Dyes

Aniline Oil.—Spot, 8d. per lb., drums extra, d/d buyer's works.
Aniline Salts.—Spot, 8d. per lb. d/d buyer's works, casks free.
Benzidine, HCl.—2s. 7½d. per lb., 100% as base, in casks.
Benzoic Acid, 1914 B.P. (ex toluol).—1s. 11½d. per lb. d/d buyer's works.
m-**Cresol** 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-**Cresol** 30/31° C.—6½d to 7½d. per lb. in 1-ton lots.
p-**Cresol**, 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.
Dichloraniline.—2s. 1½d. to 2s. 5½d. per lb.
Dimethylaniline.—Spot, 1s. 7½d. per lb., package extra.
Dinitrobenzene.—8d. per lb.
Dinitrochlorbenzene, Solid.—£79 5s. per ton.
Dinitrotoluene.—48/50° C., 9½d. per lb.; 66/68° C., 11d.
Diphenylamine.—Spot, 2s. 2d. per lb., d/d buyer's works.
Gamma Acid, Spot, 4s. 4½d. per lb. 100% d/d buyer's works
H Acid.—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.
Naphthionic Acid.—1s. 10d. per lb.
β-**Naphthol**.—£97 per ton; flake, £94 8s. per ton.
α-**Naphthylamine.**—Lumps, 1s. 1d. per lb.
β-**Naphthylamine.**—Spot, 3s. per lb.; d/d buyer's works.
Neville and Winther's Acid.—Spot, 3s. 3½d. per lb. 100%.
o-**Nitraniline.**—4s. 3½d per lb.
m-**Nitraniline.**—Spot, 2s. 10d. per lb. d/d buyer's works.
p-**Nitraniline.**—Spot, 1s. 10d. to 2s. 3½d. per lb. d/d buyer's works.
Nitrobenzene.—Spot, 4½d. to 4¾d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.
Nitronaphthalene.—10½d. per lb.; P.G., 1s. 0½d. per lb.
Sodium Naphthionate.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.
Sulphanilic Acid.—Spot, 8¾d. per lb. 100%, d/d buyer's works
o-**Toluidine.**—11d. per lb., in 8/10 cwt. drums, drums extra.
p-**Toluidine.**—1s. 11d. per lb., in casks.
m-**Xylidine Acetate.**—4s. 8d. per lb., 100%.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

Mortgages and Charges

ARTHUR J. DICKINSON, LTD., London, S.E., tar distillers. (M., 3/9/38.) August 17, debenture to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. * £800 August 4, 1937.

RICHARD THOMAS AND CO., LTD., London, W.C., steel, tinplate manufacturers. (M., 3/9/38.) August 6, Trust Deed dated July 29, 1938, securing £5,500,000 redeemable prior lien debenture stock, present issue £1,620,410; general charge (subject to, etc.); also August 9, Trust Deed supplemental to Trust Deed dated June 30, 1937, to secure an increase in rate of interest on debenture stock; charged on assets comprised in principal deed. * £7,000,000. July 29, 1937.

Satisfactions

ARTHUR H. COX AND CO., LTD., Brighton, manufacturing chemists. (M.S., 3/9/38.) Satisfactions August 17, of mortgage and charge registered April 10, 1917, and September 16, 1918.

CHARLES MOORE AND CO., LTD., Liverpool, salt manufacturers. (M.S., 3/9/38.) Satisfactions August 22, £600, registered April 5, 1910, and of mortgage registered March 22, 1920, to extent of £2,500.

Declaration of Solvency Filed

K. BEUGGER AND CO., LTD., Old Brompton, chemical manufacturers, etc. (D.S.F., 3/9/38.) W. G. Austin-Eames, 136 Canterbury Street, Gillingham (Kent). August 5.

Companies Winding-up Voluntarily

TELL AND CO. (PHARMACEUTICAL MANUFACTURERS), LTD. (C.W.U.V., 3/9/38.) By extraordinary resolution, August 25, 1938. Mr. George Frederick Pykett, College Hill Chambers, London, E.C.4, appointed liquidator.

Company News

Shaw and Marvin, mercernisers and dyers of cotton yarns, have declared a dividend on 8 per cent. cumulative participating preference shares payable September 30.

Fison, Packard and Prentice, Ltd., announce that half-yearly dividends on 7 per cent. first preference and 5 per cent. second preference shares will be paid on September 30.

Boots Pure Drug Co., Ltd., announce that the dividend for the quarter ending September 30 of 6 per cent., less tax (same), will be paid on September 30 to ordinary shareholders on record September 10.

Pinchin, Johnson and Co., Ltd., paint and varnish manufacturers, announce an interim dividend of 7½ per cent., less tax, payable September 30. A similar interim was declared at this time last year, and was followed by a final distribution of 10 per cent., making a total of 17½ per cent., less tax, for the year.

United Indigo and Chemical Co., Ltd., announce a profit of £2,864 for the year ended June 30. Profit for the previous twelve months amounted to £10,762. No dividend is being paid on the ordinary shares for 1937-38, compared with a payment of 7½ per cent., less tax, for 1936-37. The available balance amounts to £14,729, which is being carried forward, compared with £16,366 carried forward in the previous year.

Paterson Engineering Co., Ltd., show total net profit, after making provision for all administrative charges, depreciation, managing director's remuneration and directors' fees, £29,585, as compared with £25,078, £19,742 and £16,636 for the three preceding years. Subsidiary companies have contributed dividends totalling £12,920 as against £12,652 last year, maintaining a reasonable return on the investment of £126,475. The increased trading activity suggested in last year's accounts is realised by the rise in profits this year, and its continuation indicated by the greater value of stock and work in progress, £58,449, as against £50,928, and the increase of sundry creditors from £41,524 to £49,524.

Books Received

Register of Fellows, Associates and Students of the Institute of Chemistry, 1938.

The Profession of Chemistry. By Richard B. Pilcher. 4th Edition. London: Institute of Chemistry.

The Technology of Solvents. By Otto Jordan, Trans. by Alan D. Whitehead. London: Leonard Hill, Ltd. Pp. 351 25s.

Die Bierhefe als Heil-, Nähr-und Futtermittel. By Dr. Julius Schülein. Dresden: Verlag Von Theodor Steinkopff. Pp. 262. 11 RM paper cover, 12 RM bound.

Chemical and Allied Stocks and Shares

THE downward trend of values in the industrial and other departments of the Stock Exchange has continued this week. Sentiment has been dominated entirely by the disposition to await the outcome of developments in European politics, and the volume of business has been at a very low ebb. On the other hand, brokers again reported that selling pressure was moderate, and at the time of writing the lower prices appear to be attracting buyers.

Securities of companies connected with the chemical and kindred industries have moved in accordance with the general trend of markets, and shares which have a large following and usually reflect the latter very closely reacted rather sharply on balance. British Oxygen, however, are 65s. 7½d. compared with 65s. 10½d. a week ago, but Turner and Newall have gone back from 77s. 6d. to 76s., and Murex from 76s. 9d. to 75s. 7½d. Distillers were relatively steady, but are 95s. 6d. at the time of writing, which compares with 96s. 6d. a week ago. Imperial Chemical also again had a relatively steady appearance, awaiting the interim dividend announcement, and at 30s. 6d. show a decline of only 6d. on the week. Fison, Packard have remained around 35s. at the time of writing, aided by hopes that a moderate increase in dividend may be forthcoming. Triplex Glass, which have been a firmer market on consideration of the recently-issued results, are 30s. 3d. compared with 30s. 6d. last week, although the disposition is to await the statements at the meeting on Wednesday next.

B. Laporte were quoted at 87s. 6d., but were inactive. Greeff-Chemicals Holdings 5s. units were unchanged at 6s. 3d., and the 2s. shares of British Industrial Plastics continued to transfer around 2s. 9d. on the assumption that the company is making steady progress, although the current market view is that the directors will probably again limit the dividend at 8 per cent. Associated Cement have reacted from 78s. 9d. to 77s. 6d., awaiting the interim dividend announcement. Wall Paper deferred units were fairly steady at 35s. 6d. on the possibility that the dividend may again be brought up to 12½ per cent. for the year. It is being pointed out in the market that, if the distribution were reduced to 10 per cent., the yield at the current price would still be favourable. British Plaster Board have gone back to 25s. 3d., and Pinchin Johnson at 28s. 3d. are also slightly lower on balance, although the shares have shown some improvement from the price touched prior to the interim dividend declaration. The maintenance of the interim payment at 7½ per cent. created a favourable impression because the market had been talking of the possibility of a reduction. The interim announcements of International Paint and Indestructible Paint are imminent, and later in the year the results of Lewis Berger fall to be issued.

Boots Pure Drug have a relatively steady appearance at the time of writing, and at 39s. 9d. show a loss of only 3d. on the week. Timothy Whites and Taylors have kept around 25s., and Sangers were little changed at 22s. 10½d. British Drug shares were again quoted at 21s. United Steel ordinary units were little changed at 21s. 9d., there being hopes that the final dividend will be maintained, but Colvilles were a few pence down at 20s. 6d. Staveley Coal and Iron made the rather better price of 45s. 9d., awaiting the past year's figures. Dorman Long moved down moderately to 19s. 9d. Firth and John Brown and shares of manufacturers of special steels and those of companies with important armament activities were fairly well maintained in most cases.

United Glass Bottle were 48s. 6d., or 1s. below the price ruling a week ago; the interim dividend may be known by the time these notes are read. International Nickel, Swedish Match and most other shares with an international market fluctuated sharply. Tube Investments have gone back to 78s. 3d., although the market remains hopeful that the dividend announcement, due next month, may show that the 23¾ per cent. rate is to be repeated.

Oil shares have reacted under the influence of surrounding market conditions, but later in the week "Shell," Anglo-Iranian, Trinidad Leaseholds and Burmah Oil showed moderate recovery.